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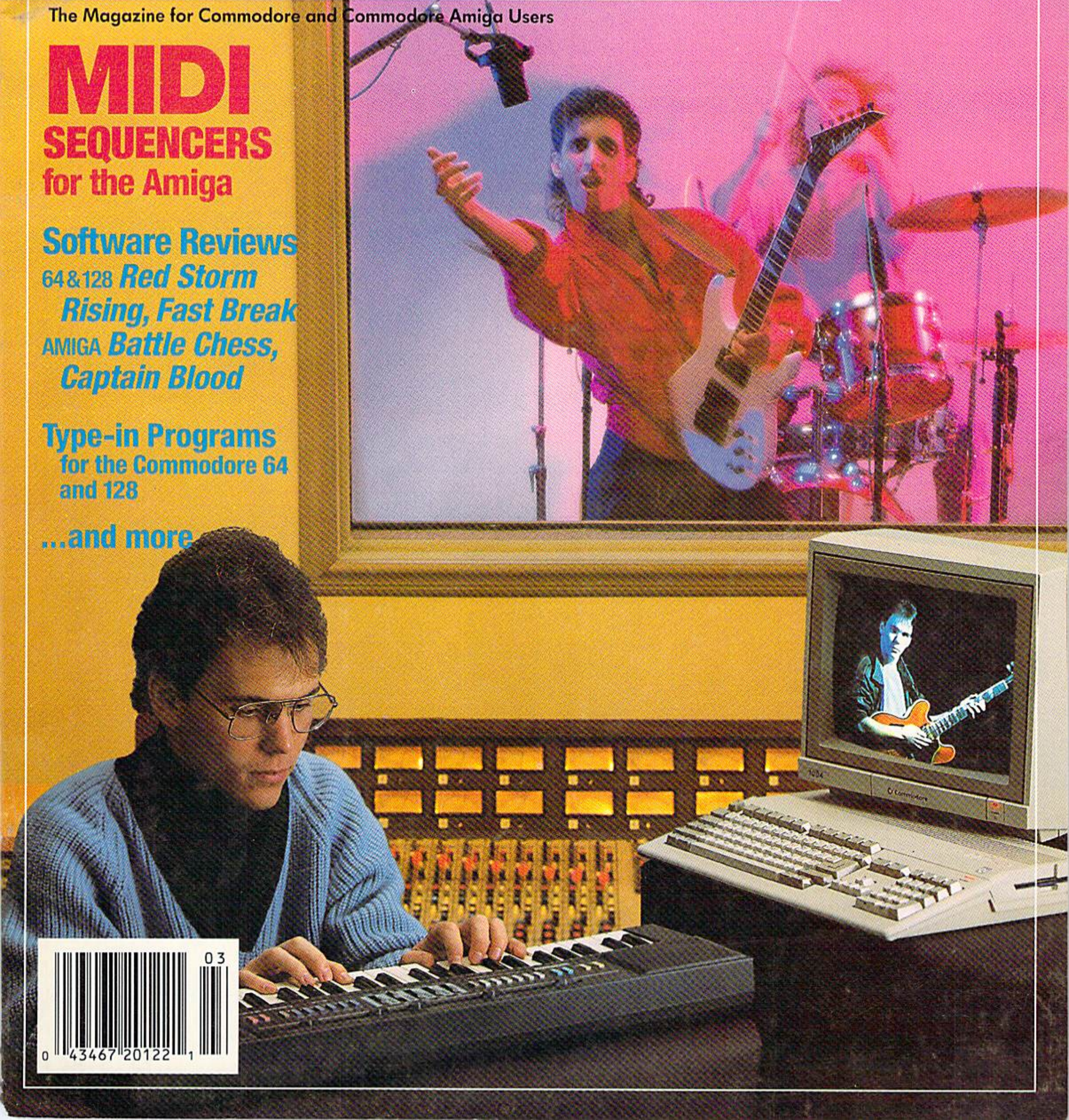
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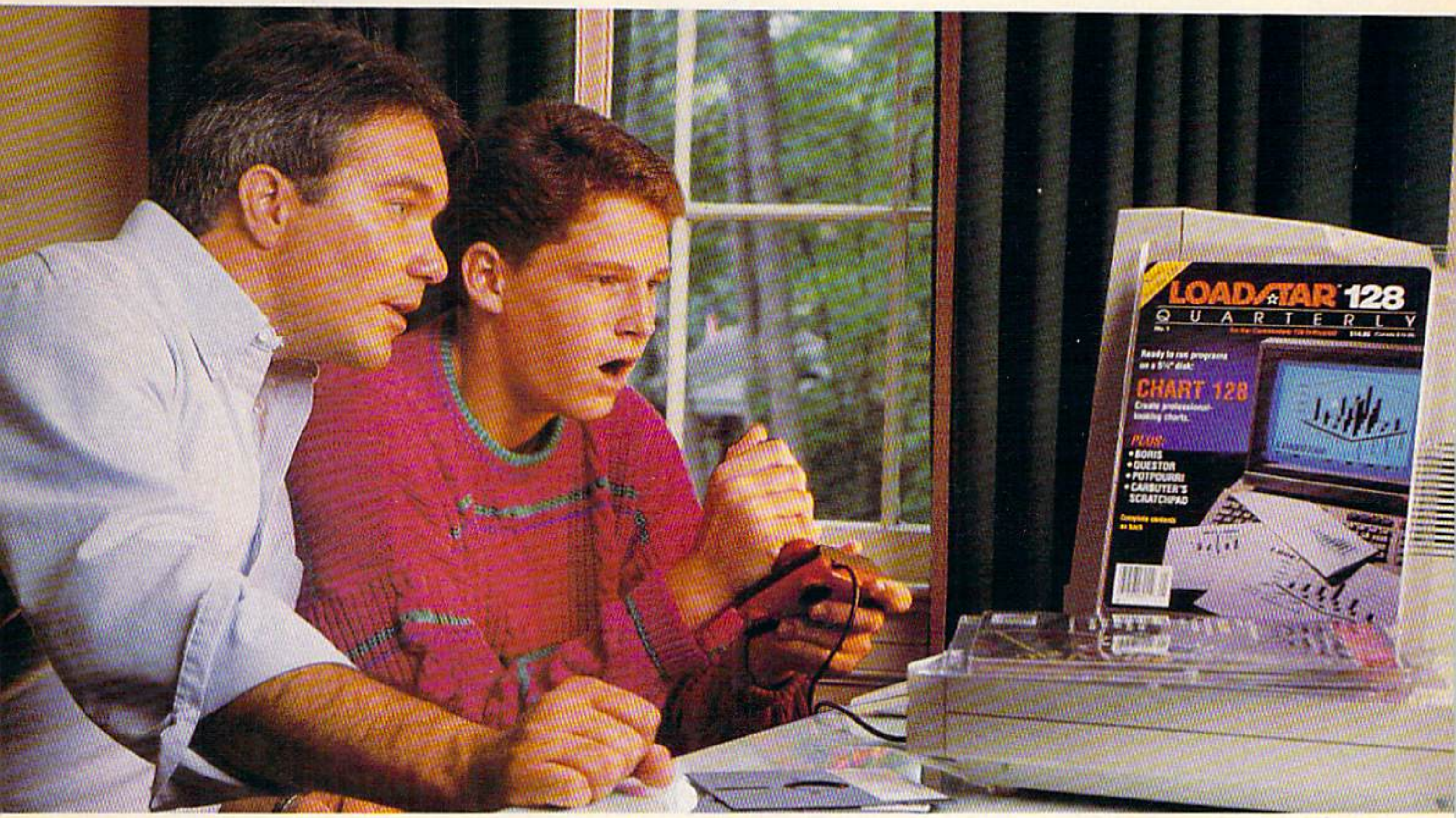


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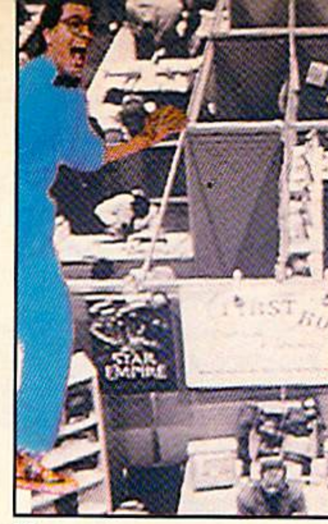
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Computers can be real budget busters, but enterprising people (who *can't* program) have found ways to make them pay for themselves. You can try these computer money-making ideas in your spare time to put you back in the black.
by Gary V. Fields

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We sent Russ Ceccola to Philadelphia to cover the largest gathering of Commodore enthusiasts ever held in the U.S. Here's what happened when Russ encountered the World of Commodore.
by Russ Ceccola

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MIDI SEQUENCERS FOR THE AMIGA 50

To turn your Amiga into a desktop recording studio you need a MIDI interface, a compatible synthesizer and a MIDI sequencer. Here's an overview of the Amiga's MIDI capabilities and a feature-by-feature comparison of the top Amiga sequencers.
by Steve King

COVER PHOTO: *Gene Smith*
Studio courtesy of
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Pennsauken, NJ

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To the Editor:

Help! I am a Mouse Killer!! My first 1351 was purchased as soon as I could find one. I treat all my hardware with greatest respect and was extra nice to my mouse. It died anyway!

After reading several articles about the importance of keeping the "ball" and "rollers" clean, I wasn't about to let *my* mouse get "gummed up." Every article seemed to agree that the best tools to use were Q-Tips™ and alcohol.

After a couple weeks of "work" (using a very clean mouse pad), I carefully took my mouse apart. I wiped off the ball with a dust-free cloth, used a quality Q-Tip and a dab of alcohol to gently wash the residue off the rollers (some of it was a little stubborn, but not extremely difficult to remove). I made certain that no liquid got into the electronics. I carefully replaced the ball, hooked it back up to the computer and . . . Voila! I was back in business—almost. The little critter was clean but the cursor no longer moved smoothly on its horizontal axis.

OK! So get it fixed, right? Three Commodore Authorized Service Centers said, "Junk it! Buy another one." Which I did, sort of. I did buy another one, but I also sent my first one back to Commodore. Hurray, they replaced it with a new one under warranty. They did not, however, supply me with any answers as to what I had done to kill my mouse.

While I was waiting for Commodore to revive Mouse #1, I proceeded to use Mouse #2. This time my master plan was to clean #2 the same as #1, but do it much sooner. I wouldn't have to rub or press the rollers at all. After about four hours of use, I sort of gently washed the surface of the rollers. UH OH! Same problem. Very erratic horizontal cursor movement. Mouse #2 was on its way to Commodore.

I am now sitting here with two brand new mice waiting to scurry into action. I have vowed not to let them out of their boxes until I know *exactly* how and how often to clean them.

What am I doing wrong? Please help. I am a long-time subscriber and would be very thankful if you would address this problem in your wonderful magazine.
Chuck Showalter
Garden Grove, CA

Technical Editor's Response:

A Commodore mouse is an extremely robust piece of equipment. The one I have at home has been slammed, dropped, dangled, strangled, drowned, buried under books, and had its tail pulled. It keeps on mousin' right along.

Here's what probably happened to your mouse: In the course of cleaning your rollers you accidentally unseated the horizontal roller. After a few tries and considerably more force than should be applied, I managed to do the same thing. By removing the mouse's top case, I was easily able to snap the roller axle back into its bearing.

If your mouse is not *under warranty, you might consider removing the top case to clean the mouse rollers. This gives you better access to the rollers without the possibility of popping them out of their bearings. For the faint of heart there are commercial mouse cleaners which consist of a ball with a special surface. A solvent is applied to the surface and the ball is placed in the mouse, which is then moved about to facilitate cleaning.*

To the Editor:

I am a Commodore 64 user and want to buy an Amiga 500 or 2000. These I can buy here, but some items are unavailable here or are rather expensive. Can you please tell me the address and information about a company which can be trusted and that can send the items I require to Saudi Arabia?
Khalid Ghaffar
Jeddah, Saudi Arabia

Editor's Response:

Tussey Computer Products offers delivery to foreign and U.S. military addresses. See their ad opposite this page for a selection of merchandise. You can write to them at: TCP, P.O. Box 1006, State College, PA 16804, USA for information on shipping charges to your area.

Correction

A report in our Amiga Desktop Publishing feature (January 1988) mistakenly stated that Electronic Arts is distributing DTP programs developed by Gold Disk. Electronic Arts is distributing the Commodore 64 program, *Paperclip Publisher.* Gold Disk is distributing their own line of Amiga software *(Professional Page, ComicSetter, Movie Setter,* etc.). For information contact: Gold Disk, 2171 Dunwin Drive, #13, Mississauga, Ontario, Canada L5L 1X2.

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Detroit has seen better days. A gang of ruthless hoods has overrun the city, and crime is out of control. Attacks on the streets. Drug trafficking. Corruption and cop killing. It's so bad a private firm, O.C.P., now runs the police department.

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Screens shown are from arcade version. Computer version may vary.

Commodore Announces New Amiga Models

Commodore has announced two new models in the Amiga line of personal computers. These two computers represent powerful configurations of the Amiga 2000.

The Amiga 2000HD starts with all of the features of the Amiga 2000 such as a Motorola 68000 processor running at 7.13MHz, a built-in 3.5-inch drive (880K formatted) and 1 MB of RAM. It then adds Kickstart 1.3, an Autobooting Hard Disk Controller and a 44 MB (28ms) hard drive.

The Amiga 2500 enhances the Amiga 2000 with a Motorola 32-bit 68020 processor running at 14.26 MHz, a 68881 math coprocessor, a 68851 memory management unit and an additional 2 MB of RAM. It also includes Kickstart 1.3, the Autobooting Hard Disk Controller, a 40MB (28ms) hard drive which is preformatted and pre-loaded with system software.

Suggested retail price for the Amiga 2000HD is $2999 and for the Amiga 2500 is $4699. For more information, contact: Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.





World of Commodore

The second U.S. World of Commodore will be held May 19-21 at the Los Angeles Convention Center. (See page 58 for a full report on the first U.S. World of Commodore held in Philadelphia.) Commodore 64, 128 and Amiga developers, vendors, publications and enthusiasts (as well as Commodore Business Machines, Inc.) will be available to show off the latest hardware, software and accessories for your Commodore or Amiga computer. Ticket price is $10 ($8 for students and seniors) and includes admission to all seminars. For details contact: The Hunter Group, 204 Richmond St. W, Ste. 410, Toronto, Ontario, Canada M5V 1V6. Or call: (416) 595-5906.

The Disc Company Launches Amiga Software Search

The Disc Company has launched a $1,000,000 campaign to acquire innovative Amiga software programs. Disc Company president Robert Kotick said, "We are offering independent developers an attractive compensation package consisting of generous advances and significant royalties, and because of our financial resources and marketing talent we expect to attract a number of noteworthy submissions." All program submissions will be evaluated; however, audio, video, graphics and entertainment programs are of particular interest. For details write to: Amiga Software Submission Program, The Disc Company, 3135 S. State St., Ann Arbor, MI 48108.



Viking 1

Commodore Business Machines, Inc. and Moniterm Corporation have jointly released a high-resolution monochrome monitor for the Amiga 2000. The 19-inch **Viking 1** which has a resolution of 1008 × 800, was designed for such things as desktop publishing, CAD, word processing and financial applications. The **Viking 1** carries a suggested retail price of $1,995. For more information contact: Moniterm Corporation, 5740 Green Circle Drive, Minnetonka, MN 55343. Phone: (612) 935-4151. Or call (800) 343-3000 to find the Commodore/Amiga dealer near you.

Continued on page 8

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Grand Prix Circuit

Grand Prix Circuit for the Commodore 64 is Accolade's follow-up to their best-selling racing game **Test Drive.** This first-person perspective simulation pits you against nine international competitors on eight tracks for the World Driving Championship title. There are five levels of play, each requiring more skill than the last. **Grand Prix Circuit** retails for $29.95. For details contact: Accolade, 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128. Phone: (408) 985-1700.





Nag Plus 3.0

You'll never forget your mother-in-law's birthday again with **Nag Plus 3.0** on your Amiga. **Nag** is a scheduling system from Gramma Software that will verbally remind you of up to 99 events per day using the Amiga's built-in voice capabilities. (Or you can program an alarm as a screen flash or any of 24 different bells and whistles.) You can enter birthdays, anniversaries and special dates one time on **Nag**'s perpetual calendar and be notified in advance every year. **Nag**, which runs in the background with other Amiga software, will even automatically dial your phone. **Nag Plus 3.0** retails for $79.95. For further information contact: Gramma Software, 17730 15th Avenue NE, Suite 223, Seattle, WA 98155. Phone: (206) 363-6417.



Galactic Conqueror

Titus Software's latest Amiga release is **Galactic Conqueror.** This high-speed save-the-galaxy arcade game features as many as 40 sprites on screen at once. Titus also claims that **Galactic Conqueror** features the "largest sprites ever seen on computer." The program retails for $44.95. For details contact: Titus Software, 20432 Corisco St., Chatsworth, CA 91311. Or call: (818) 709-3693.

Paragon/Marvel Release

Paragon Software has announced **Spider-Man and Captain America in Dr. Doom's Revenge** for the Commodore 64. The first in a series of programs released under agreement with Marvel Comics, **Spider-Man** is billed as an "interactive comic/arcade adventure." Dr. Doom is plotting to steal a U.S. nuclear missile, and Spider-Man and Captain America are called in to save New York City. The program is scheduled for a June release. For more information contact: Paragon Software, 600 Rugh St., Suite A, Greensburg, PA 15601. Phone: (412) 838-1166.

Rampage

Activision's **Rampage** is now available for the Commodore 64. Licensed from Bally Midway, **Rampage** is a 3D monster-movie-style action game for one or two players. Each player becomes either a giant gorilla, a lizard or a wolf and makes his way across the country through 157 different cities and skylines. **Rampage** carries a suggested retail price of $34.95. For further details contact: Activision, 3885 Bohannon Dr., Menlo Park, CA 94025. Or call: (415) 329-0800.

MacArthur's War

Electronic Arts' Strategic Studies Group has released **MacArthur's War,** a Commodore 64 simulation of eight battles from the Korean war. The game includes SSG's Warplan which allows you to revise the course of history. **MacArthur's War** carries a suggested retail price of $39.95. For more information contact: Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. Phone: (415) 571-7171.

Dream Zone

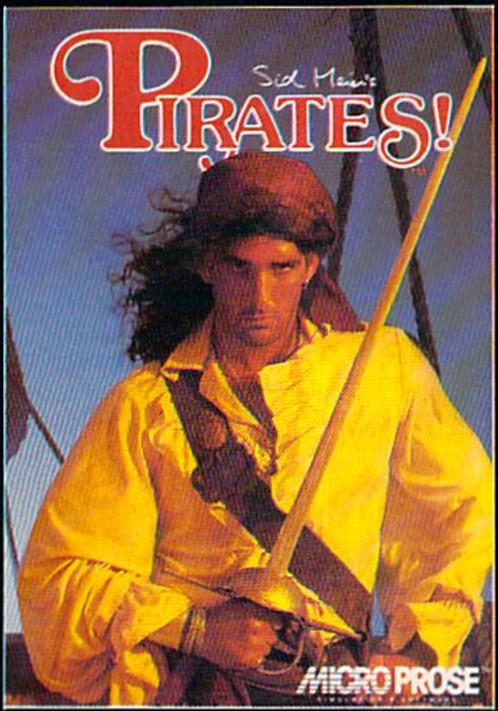
You are a prisoner of your own dreams in Baudville's latest release for the Amiga, **Dream Zone.** A mad scientist has locked you in your dream world, and you must use all your resources to find the source of your nightmares and overcome the dream state. **Dream Zone** is available at a suggested retail price of $49.95. For further information contact: Baudville, 5380 52nd St., SE, Grand Rapids, MI 49508. Phone: (616) 896-0888.

Double Dragon

Arcadia has developed a Commodore 64 version of the Kung-Fu arcade game **Double Dragon.** The game pits twin brothers against a gang of street thugs who have kidnapped one brother's girlfriend. Like the coin-op version, two players can simultaneously battle opponents. **Double Dragon,** distributed by Electronic Arts, retails for $34.99. For more information contact: Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. Phone: (415) 571-7171.

Continued on page 10

Pirates Continue To Win Awards!

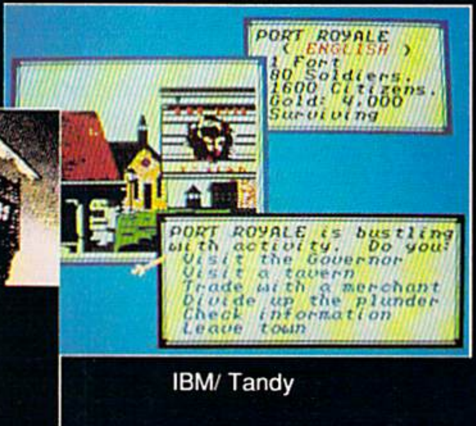


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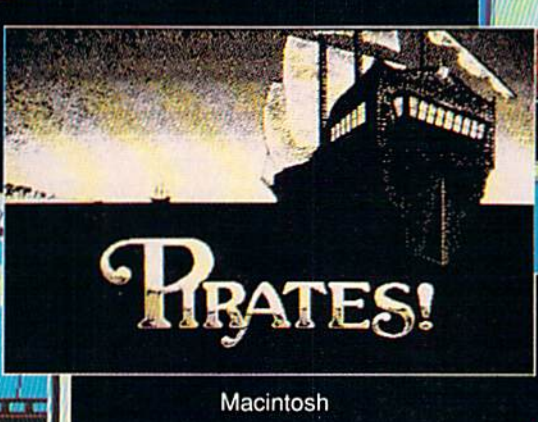
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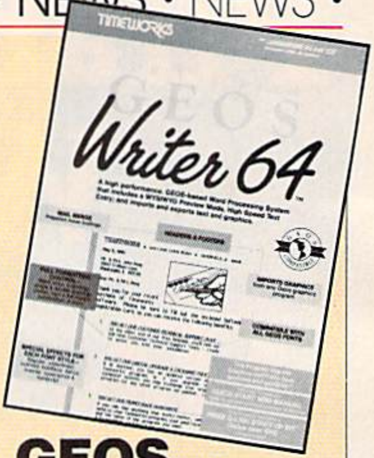
Donald Trump's name seems to be on everything these days, including this new casino simulation for the Commodore 64 and Amiga. The package also contains $300 worth of coupons for services at Trump Castle Hotel and Casino in Atlantic City. In addition, Intracorp has included blackjack, roulette, craps, keno, video poker and slot machine simulations, so you can get your strategy down before you hit the boardwalk. The game follows New Jersey Casino Control Commission rules (except for keno and poker—not played in NJ). The Amiga version retails for $39.95, the Commodore 64 version for $34.95. For more information contact: Intracorp, Inc., 14160 SW 139th Ct., Miami, FL 33186. Or call: (305) 252-9040.

Commodore PC40-III

Commodore has released the PC40-III personal computer. This is a PC/AT-compatible computer with a high performance, 12 MHz 80286 microprocessor. Features include a 101-key enhanced AT keyboard, 1.2 MB 5 1/4-inch floppy, fast (19ms) 40MB hard drive, 1 MB RAM, built-in VGA video adaptor, three available PC/AT- and one available PC/XT-compatible expansion slots and built-in parallel, serial and mouse ports. The PC40-III comes complete with MS-DOS 3.30 and GWBASIC 3.22.

Suggested retail price is $2395. For more information, contact: Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.





GEOS Writer 64

Timeworks, Inc. has released **GEOS Writer 64,** a GEOS-compatible word processor. The program includes a 100,000-word spell checker, WYSIWYG preview mode, mail-merge capability, and compatibility with **geoPaint** and **geoWrite.** Backed by Timeworks' money-back guarantee, **GEOS Writer 64** retails for $49.95. For more information contact: Timeworks, Inc., 444 Lake Cook Rd., Deerfield, IL 60015. Phone: (312) 948-9200.

ProFonts

New Horizons' **ProFonts Volumes I and II** contain additional fonts for use with the Amiga word processor, **ProWrite.** Volume I consists of professional fonts for correspondence and reports; Volume II includes more decorative fonts. Both packages can be used with other Amiga programs such as **DPaint II** and **PageSetter. ProFonts Volumes I and II** are sold separately for $34.95 each. For further information contact: New Horizons Software, P.O. Box 43167, Austin, TX 78745. Phone: (512) 328-6650.

Magellan Contest

Emerald Intelligence is sponsoring a contest for users of their **Magellan** expert systems software. A grand prize winner in each of three categories (Most Productive, Most Creative and Most Bizarre Applications) will receive a **Magellan** Developer Package and Moniterm monitor (total retail value $3000). Two runners-up in each category will receive a **Magellan** Developer Package (total retail value $1000). Deadline for entries is June 1, 1989. The winners will be announced at AmiEXPO Chicago in July. For contest rules contact: Emerald Intelligence, 344 S. State St., Ann Arbor, MI 48104. Or call: (313) 663-8757.

Red Storm Rising Ultimate Challenge

March 31 is the deadline for your entry in the **Red Storm Rising** Ultimate Challenge, sponsored by **Commodore Magazine** and MicroProse Software. Be sure to send for your Official Log Form to record your top scores for a chance to win a trip for two to Scotland and England, a Commodore 128D or many other prizes. See pages 16 and 17 for more details.

Here are some high scores to date around Commodore that you can use to measure your efforts. Rumor has it that someone (outside Commodore) achieved a rating of 29,000 ER. Keep in mind that the top 15 scores make it to Rear Admiral and continue in the contest.

Greg Givler, Telecommunications Coordinator — 16,975 ER
James Gracely, Managing Editor — 6943 ER

Here are a couple of advanced hints to help you get those extra points:

- To get the highest possible ER you must choose the Ultimate level in 1984 with a Permit class submarine.
- Time is one of the factors in your ER. If you complete a mission but spent a lot of time stalking, running and chasing, you might still want to replay it to get the time down and increase your ER.

Lou Sander's Tips & Tricks

Compiled by Louis F. Sander

This month we have some interesting discoveries about filenames and disk directories, plus the usual assortment of tips for all areas of computing. We've even got one from the People's Republic of China!

Regardless of where you live, we're interested in seeing your tips. Send them to:

Louis F. Sander
P.O. Box 101011
Pittsburgh, PA 15237

Don't forget to enter the programming contest!

Programming Contest

As we announced last month, we're running a contest to find short and *useful* reader-written programs for Commodore computers. Here are the rules:

1. Programs must serve some *useful* purpose outside the world of computers. Programs for science, math, business, education, household calculations and similar uses are acceptable. Games and computer utilities are not. Of this month's programs, only VCR Label Printer would fit in the "useful" classification. Notice that its purpose is not related to computers.

2. Programs must be shorter than four blocks on the disk. If the directory says one, two or three, they are OK. If the directory says four, they are too long. Most three-block programs are shorter than 25 lines, but everything depends on the length of the lines.

3. Entries must be submitted on a disk, accompanied by a listing and instructions. Sorry, we cannot return this material to you.

4. Judging will be based on *usefulness,* originality and overall user friendliness. The best program will be featured in "Tips & Tricks" and will receive a prize of $100. The best of the others will be published and paid at our usual rates.

5. Entries must be postmarked by midnight, March 15, 1989. Send them to me, at the address at the head of this column.

Louis F. Sander
Pittsburgh, PA

VCR Label Printer: Video cassette recorders are everywhere today. As they say, "How did we ever get along without them?"

Since videotapes are often used over and over, the labels that come with them are soon cluttered and virtually useless. This program uses your printer to create a neat little form which can be used in place of the label and kept inside the box.

The first column of the label is for the starting index on the tape counter. A finishing index is not needed, as it is the same as the starting index of the next program on the tape. The second column is for the name of the program, and the third is for the playing time, a useful thing to know.

Ralph H. Rethoret, P. Eng.
North York, Ontario
Canada

```
100 REM VCR LABEL PRINTER - R.RETHORET
110 OPEN 3,4:B$="[SHFT *6]"
    :C$="[SPACE6]":D$="VIDEO CASSETTE
    INDEX"
120 PRINT#3,C$;"[SPACE3]";D$:PRINT#3
130 PRINT#3,"[SPACE2,CMDR A]";B$;"
    [CMDR R]";B$B$B$;"[CMDR R]";B$;"
    [CMDR S]"
140 PRINT#3,"[SPACE2,SHFT -]START
    [SHFT -,SPACE6]TITLE[SPACE7,
    SHFT -] TIME [SHFT -]"
150 PRINT#3,"[SPACE2,CMDR Q]";B$;"
    [SHFT +]";B$B$B$;"[SHFT +]";B$;"
    [SHFT -]"
160 FOR J=1 TO 12
170 PRINT#3,"[SPACE2,SHFT -]";C$;"
    [SHFT -]";C$C$C$;"[SHFT -]";C$;"
    [SHFT -]"
180 PRINT#3,"[SPACE2,CMDR Q]";B$;"
    [SHFT +]";B$B$B$;"[SHFT +]";B$;"
    [SHFT -]"
190 NEXT
200 PRINT#3,"[SPACE2,SHFT -]";C$;"
    [SHFT -]";C$C$C$;"[SHFT -]";C$;"
    [SHFT -]"
210 PRINT#3,"[SPACE2,CMDR Z]";B$;"
    [CMDR E]";B$B$B$;"[CMDR E]";B$;"
    [CMDR X]"
220 CLOSE 3
```

Eliminating Leading Spaces with STR$: We're students of high school attached to Tsinghua University in Beijing, and we're enthusiastic readers of *Commodore Magazine.* We like the "Tips & Tricks" column very much, because most of the tips are interesting and helpful to us. We've just found out a tip about STR$. Here it is:

When you use the STR$ function to convert a number to a string, the computer always makes a little trouble for you. For

example, if you run:

10 A$="1234"
20 B$=STR$(5678)
30 PRINT A$+B$ the screen will show:
1234 5678

A space appears between the two numbers. How to avoid it? Add this line:

25 B$=RIGHT$(B$,LEN(B$)-1)

Then running the program will show you:

12345678

There is no space between the two numbers. The original problem arises because the STR$ function returns a string that has a leading blank in the position where the number's sign would be. If the original number is negative, there will be a minus sign in place of the leading blank.

Qiyong Bian & Chen Jiao
Tsinghua University
Beijing, China

Invisible Filename: This makes it impossible to see a file's name in the directory, and makes that file very tough to scratch. It only works for one file per disk. When you save the file, just put a colon at the end of the filename, like this:

SAVE"filename:",8

The trick doesn't work with the DSAVE command.

Sean Peck
Pittsburgh, PA

Using Variables in BASIC 7.0 Filenames: The various commands for saving and loading will return a syntax error when you try to use a string variable such as A$ in place of a filename inside quotes. The problem arises with DSAVE, DLOAD, BSAVE and BLOAD, for example, when you try something like this:

100 A$="PROGRAM #1"
110 BLOAD A$

You can get around the problem by using the following syntax instead:

110 BLOAD ""+A$

Something about adding your variable to the null string makes it much more attractive to the computer.

Howard Melton
Saffell, AR

128 unSCRATCHable Files: The SCRATCH command will not work with any file whose name begins with the @ sign. You cannot make such a file using the DSAVE command, but the following syntax will create one:

SAVE "@filename",8

Jeffrey C. Johnson
Allensville, PA

128 Easy Program Loading: Here's a one-liner that lets you load programs from the directory listing on the screen:

10 KEY2,"DLOAD"+CHR$(27)+CHR$(75)+CHR$(20)+CHR$(20)+CHR$(20)+CHR$(13)

When you run the program, the F2 key is redefined. After the redefinition, use the DIRECTORY command to list the directory onto the screen. Move your cursor to the start of the line that contains the program you want to load, then press the F2 key. The program will load in a flash!

The KEY listing for F2 is an interesting conversation piece. It looks like a syntax error should be generated, and it does not reveal what F2 actually does. (After running the program, enter KEY2 and see what I'm talking about.)

Jim Willis
Texarkana, AR

128 Easier Program Loading: When you save a program, end its name with a shifted space and a colon, making sure it doesn't run over 16 characters including the space and the colon. To load it, just list the directory to the screen, move the cursor to the beginning of that program's line, then press F2.

Victor Patuzzi
Athens, TN

128 DOS Shell Directory Printouts: When using the DOS Shell program, you can get a printed copy of a disk's directory by pressing F3 when the directory is displayed for any of that program's activities (copy files, rename files, delete files, etc.)

Brian Noggle
House Springs, MO

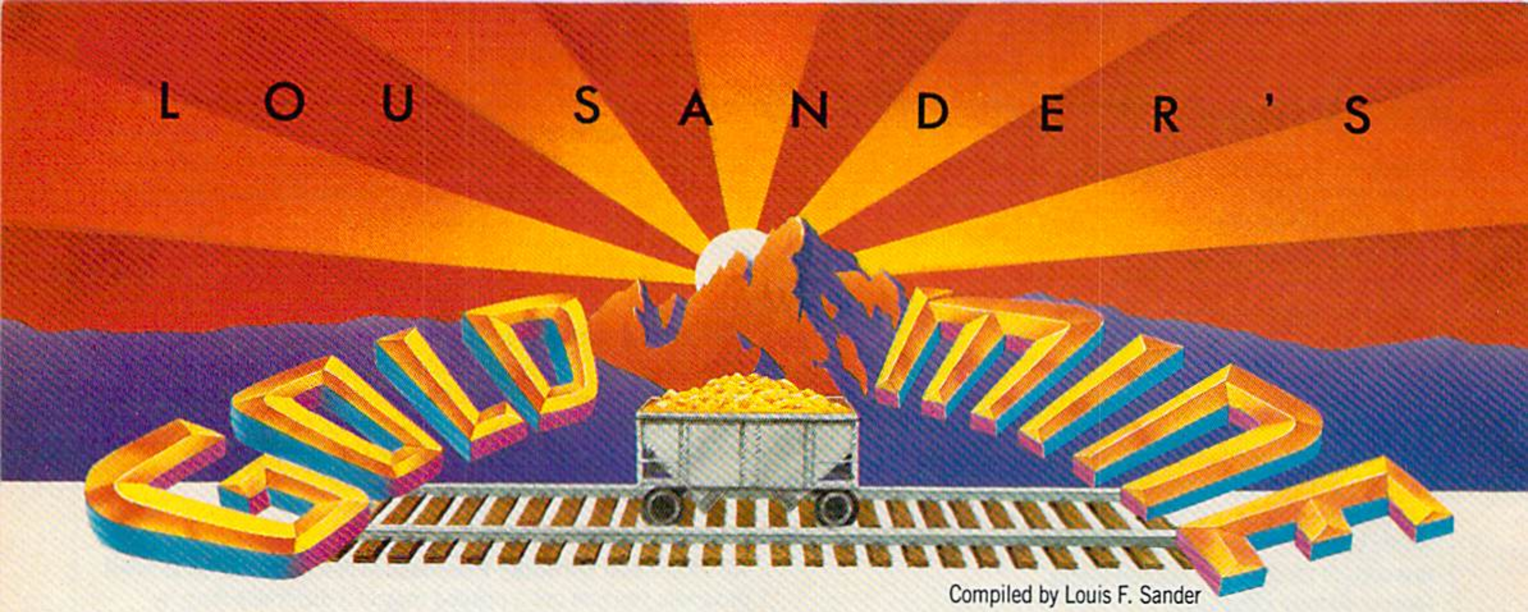
Directory: This program reads the directory from disk and sends it directly to the printer. It was, of course, written with extensive use of the 1541 disk drive manual, especially the tables mapping the layout of the directory file.

Mark Riedel
Lombard, IL

```
100 REM DIRECTORY BY MARK RIEDEL
110 OPEN 15,8,15:PRINT#15,"I0"
    :CLOSE 15
120 FOR A=1 TO 4:READ AR$(A):NEXT
    :DATA"SEQ","PRG","USR","REL"
130 OPEN 1,8,2,"$":OPEN 2,4,0
    :FOR A=2 TO 143:GET#1,A$:NEXT
    :N$=" DISK: "
140 FOR A=144 TO 161:GET#1,A$
    :IF A$<>CHR$(160) THEN N$=N$+A$
150 NEXT
155 GET#1,I1$,I2$,A$,O$,S$
    :PRINT#2,N$;",";I1$;I2$;" (";O$;
    S$;")":PRINT#2,
160 FOR A=167 TO 255:GET#1,A$:NEXT
170 FOR A=1 TO 8:GET#1,TY$,A$,A$:N$=""
180 IF ST THEN 270
190 IF TY$="" THEN TY$=CHR$(128)
200 FOR B=3 TO 18:GET#1,B$:N$=N$+B$
    :NEXT
210 GET#1,B$,B$,B$,B$,B$,B$,B$,B$,B$,
    L$,H$
220 LO=ASC(L$+CHR$(0))+256*ASC
    (H$+CHR$(0)):IF LO=0 THEN 250
230 A$=STR$(LO)
240 IF ASC(TY$)>128 THEN PRINT#2,A$;
    SPC(5-LEN(A$));N$;" ";
    AR$(ASC(TY$)-128)
250 IF A<8 THEN GET#1,TR$,SE$
260 NEXT:GOTO 170
270 CLOSE 1,2:PRINT#2,CHR$(12):END
```

64 Horse Race: Now you can feel the excitement of horse races in the comfort of your own chair and without the fear of losing actual money. At the beginning of each session, you start with $500 cash.

Continued on page 70



Compiled by Louis F. Sander

Here's our latest collection of stunning game tips. Many of them work on the 64, 128 and/or Amiga, in addition to those "unknown" brands such as Apple, Atari and IBM.

Though we run a first-rate mine, you must always be alert for fool's gold. Since contributors send us so many great-looking nuggets, and since there are only 24 hours in our day, we have no way of testing every tip we print. Also, many of the tips require skill as well as knowledge, or work as described only on one variety of machine. In other words, don't be too upset if a given nugget doesn't work for you.

If you have useful game tips of your own, write them up and send them in. Our address is:

The Gold Mine
P.O. Box 101011
Pittsburgh, PA 15237

Please use a separate sheet of paper for each game, and combine all tips for one game onto a single sheet. Put your name and address on every sheet you prepare. Combine all sheets into one envelope and send it in.

Neatness counts, and we prefer tips to be typed or printed, double spaced, on 8 ½" × 11" paper. Handwritten tips are acceptable, but less likely to be chosen for publication. Whatever you do, do not put your tips on little cut-up strips of paper or on sheets torn out of spiral notebooks.

If you can't get enough of the "Gold Mine," you'll be pleased to know that we're planning a "Gold Mine" book. As you read these words, we're negotiating a contract for a reprint of everything that's appeared in the column to date, plus hundreds of new and better items. We'll keep you posted on developments.

As always, when you savor this month's offerings, or when you anticipate our future works, remember that world-famous motto—Gold Mine Rules!

Aliens: You can skip a level and confront the queen by pressing the up arrow and RESTORE after each of the different screens. But to defeat her, you must successfully complete each screen level or enter the status code for successful completion.

For those who want to confront the queen and destroy her right away, enter one of these status codes when the program prompts you for it: 5893D, 95+3F, 6483E, 6373H.
Christopher M. Rivera
Ft. Wainwright, AK

Axis Assassin: Go to the center lane, halfway down, and clear it. Pour shots down the lane, destroying anything coming or going. When the lane is totally clean, do an about-face and destroy the accumulation of enemies on the edge. Quickly do another 180 and clear the oncoming bars. This should get you through the first couple of waves.
Matt McLaine
Walterboro, SC

Aztec Challenge: On the stairs, try to stay in the middle. This will prevent you from getting trapped on one side.
Jason Bardanza
Sanford, ME

Barbarian: The best way to go on to the next board is to chop off your opponent's head. To do this you must press the button and push the joystick to the left.
Lenny Vaysberg
Brooklyn, NY

Beach Head: On the third screen, after destroying all the ships, continue shooting until the drive is accessed. You'll get 2000 points a shot.
Hong Yu Tung
New York, NY

Bounder: Here are a few good items the instructions don't tell you about: The basketball bouncing on a backboard is worth 20 jumps. The bee and microchip that float down the screen's center are worth a lot, too.
Justin Stephenson
Evansville, IN

Bulldog: If you want to win every time, get one F, one B, one I, and a forward S. Here are the meanings of the letters:

B — Blaster fire (continuous)
D — Destroy your abilities
F — Fighter shape change(s)
I — Immunity from shots
S — Speed (Forward = increase, Backward = decrease)

Matt McLaine
Walterboro, SC

Burnin' Rubber: When you play this game, you have to scratch as many cars as you can. Then you get 500 points for each car you scratched. One day I decided not to scratch any cars at all, and I got 50,000 extra points! Since you get an extra life when you reach 100,000 points, my discovery lets you get bonus lives very easily.

It's difficult not to touch any cars, but if you practice it becomes easier.
Arnaud Wiesmann
Jongny, Switzerland

Comics: In the underwater river, you can get fresh air and avoid the turtles by staying near the top of the cavern.
Contributor Unknown

Dark Castle: If you're frustrated at the hero's slow foot speed, why not jump instead? Hold the joystick either left or right, then press the fire button to do a long jump. It saves time and gets you away from the nasties much quicker.
Jay Spagnolo
West Warwick, RI

Demon Stalkers: Some items are just not worth going after, but never pass up an artifact. They're rare, but usually scrolls will hint at the location.

Don't pick up too many keys, because you won't be able to pass a passage blocked by a key. If monsters appear from nowhere, don't panic—it's only a hidden Vortex.

Watch out for Levels 65 and 66, since it's very easy to get lost in the Matrix.
Steven Gabaris
Flushing, NY

Fairlight: If your Life Force runs low when questing for the Book of Light and you need to get past an Orc guard, drop a goldbag in the room. The Orc will go after the bag and leave you alone.

You'll need the Crown to get the Book, and be careful not to drop the Crown in a room with Whirlwinds—they'll take it and almost anything else that isn't guarded.
Brian Proefrock
Port Crane, NY

Friday the 13th: A sure way to get Jason is to stab or shoot every person you see. When you finally hit the disguised Jason, he will turn into a person dressed in black, and he'll very likely attack you.
Christian Enescu
Address Unknown

Gridrunner II: On Attack of the Mutant Camels, you can jump to the next level by pressing the CTRL key, the COMMODORE key and the fire button at the same time. You also get the mystery bonus.
Mark Horchler
Ellsworth, ME

Guild of Thieves: For a quick way to enter the castle, go to the scrub and type in "help old man." After he has entered the castle, type in "go to castle." You will be in the castle.
Tom Bray
Address Unknown

Gunship: If your engines get hit, autorotate until you are about 300 feet off the ground, then use your collective pitch to land a little less roughly. If you have a fast load cartridge of some sort, don't leave it in when you load the game.
Patrick Williams
Buckeye, AZ

Hardball!: There is an easy way to throw runners out even though the ball is hit to the outfield. If the ball is hit to the left field, throw the ball to third base. If the ball is hit to right field, throw the ball to first base. Never throw the ball to second base, as it always takes longer for the ball to get there.

If you are in a two-player game, this routine could help you catch a baserunner trying to get an extra base!
Eric Chan
Dallas, TX

Howard The Duck: When things get tense and you need a break, just pause the game. (Commodore 64: F7, Apple: spacebar).

When fending off mutants in the Advanced and Expert modes, timing is crucial. Knock off individual mutants as soon as you can, since it's the only way you'll ever get closer to their mounds. When up against the currents with either Jet Pack or Ultralight, try to move only up or down. If you try to move left or right, you'll become more easily entangled in the currents.

If you are swarmed over by mutants, remember that you can't destroy one unless they are all spinning.

Finally, when you're flying the Ultralight, move only up and to the right continuously to find the best path to the volcano.
Dan Hartensveld
Wayne, NJ

Jumpman: If you have used the *Jumpman* immortality program and you want to get out of a level that's too hard for you, just press RETURN and you'll be back at the main menu.
Nelson Yung
Winnipeg, Manitoba, Canada

Kane: On screen one, try to kill as many birds as possible with one arrow; you will get more peace tokens (which are lives) and arrows.

For screens two and four, use F1 to start over if you crash on your horse.

On screen four (horse ride two), go at the same speed as the train until you clear the first two obstacles. Then go full speed ahead!
James Reese
Address Unknown

Legacy of the Ancients: It is best to close down the gambling house and then rob the town. Of course, you must first be strong enough to loot it. Level 2 or higher is good enough, but if you are not there you should have at least 50 Firebolts and Magic Flames.

If you're not ready, but want to rob the town anyway, go up to a Merchant and kill him, but do not move. Then select the Rob option. Next, without moving, exit the town by choosing the Leave option. You won't be caught and will be able to return without being chased out.
Allen Morano
Barstow, CA

Continued on page 111

Presenting the **Red Storm Rising**™ Ultimate Challenge

Win a Trip for Two to

***Now** Red Storm Rising — the gripping World War III submarine simulation by MicroProse Software for the Commodore 64 — is more exciting than ever. Your skill as Captain of a nuclear attack sub in the North Atlantic can win you and a companion an unforgettable visit to Great Britain!*

MicroProse Software and *Commodore Magazine* have convened a Board of Naval Examiners to find the *Admiral of the Fleet* — the very best *Red Storm Rising* nuclear submarine commander in the world.

Grand Prize

In September, 1989, the *Red Storm Rising Admiral of the Fleet* and a companion will travel on a 7-day expense-paid travel award to Great Britain. They will visit Dunoon, Scotland, home of the US submarine base at Holy Loch from which *Red Storm Rising* players operate. Then it's on to London, where they will marvel at the huge, international 1989 Personal Computer Show. The *Admiral of the Fleet* will also win a complete library of current MicroProse Software titles for the Commodore 64, a one-year subscription to *Commodore Magazine*, and *Red Storm Rising* materials autographed by Tom Clancy, author of the best-selling novel, *Red Storm Rising*.

Prizes for Runners-Up Too!

The First and Second Runner-up *Vice Admirals* will receive a Commodore 128-D Computer System, a complete library of current MicroProse Software titles for the Commodore 64, a one-year subscription to *Commodore Magazine*, and *Red Storm Rising* materials autographed by Tom Clancy.

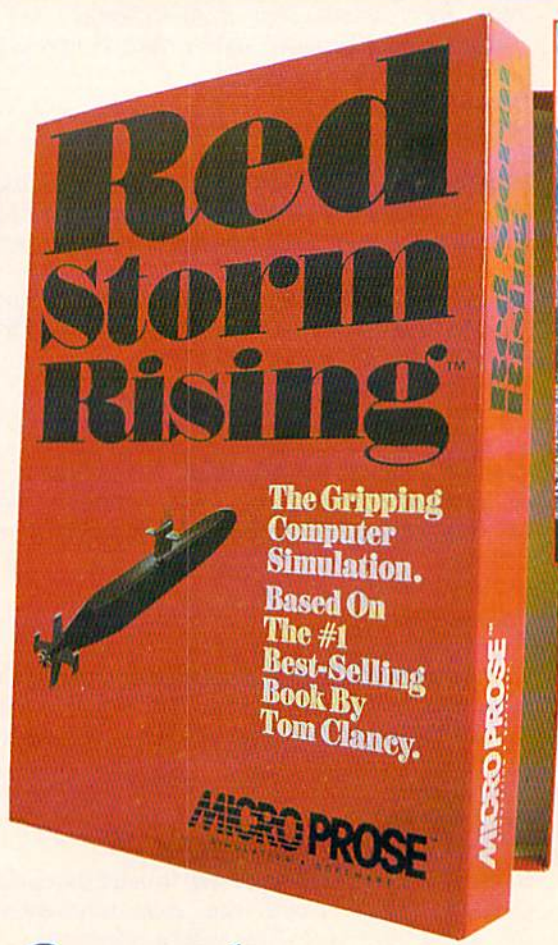
Another seven *Vice Admirals* will receive a complete library of current MicroProse Software titles for the Commodore 64, a one-year subscription to *Commodore Magazine*, and *Red Storm Rising* materials autographed by Tom Clancy.

Strategy

First, send for your *Official Log Form* and complete *Rules* (see "To Enter" on next page). Then, start playing the full *Red Storm Rising* campaign game and learn to achieve maximum Efficiency Rating (ER). (For your initial entry and first round of competition, your best campaign will be the campaign with your highest ER.) Learn how to protect the ER of your campaign in progress by choosing the "Computer Log" option at the "Contact Screen" preceding each battle, and then saving your game. (The "Contact Screen" is shown at right.) If your performance does not meet your standards in the ensuing contact, you can re-play it (before going on to another battle) without losing your previous score. On the *Official Log Form* you will fill in the details of each of your most successful battles in your best campaign. Before you fill out the form, you might make photocopies so that you can keep trying for higher and higher ERs.



Contact Screen





Commodore
MAGAZINE

sponsored by Commodore Magazine and MicroProse

Scotland & England!





Dunoon, Scotland with a 14th US Navy Submarine Squadron ship and floating dock in the Holy Loch.







To Enter

1. Obtain an *Official Log Form* and the complete *Rules* by sending a letter or postcard as soon as possible to the *Red Storm Rising* Board of Naval Examiners, 180 Lakefront Drive, Hunt Valley MD 21030. (Several pre-addressed postcards have been inserted into this edition of *Commodore Magazine*.)

2. Submit your **final** game save disk (**one disk only**) *and* a completed *Official Log Form* from your highest-ER *Red Storm Rising* Campaign to: *Red Storm Rising* Board of Naval Examiners, 180 Lakefront Drive, Hunt Valley MD 21030. Your entry must be **received** not later than March 31, 1989.

Naval Operations: Orders

The Board of Naval Examiners will make every effort to ensure that the *Red Storm Rising Ultimate Challenge* is a fair competition and a meaningful test to all who enter. As you proceed into the higher levels of competition, the Board of Naval Examiners will advise you of specific examination procedures.

The Timetable

March 31, 1989	Deadline for Board of Naval Examiners to **receive** Official Log Form and final game save disk from Entrants seeking promotion to Admiral.
April 3, 1989	During this week, the Board of Naval Examiners will select 15 Rear Admirals from among All Entries received.
April 10, 1989	During this week, Appointments will be set for 15 Rear Admirals to be interviewed via telephone, by the Board of Naval Examiners.
April 17, 1989	During this week, the Board of Naval Examiners will interview the 15 Rear Admirals, and grant promotions to 10.
April 30, 1989 (Red Sunday)	Ten (10) Vice Admirals will compete in the Red Alert War Game for the right to be called Admiral of the Fleet.
May 1, 1989	Verification Process Begins; Vice Admirals return records from the Red Alert War Game.
Late Sept., 1989	Admiral of the Fleet and a companion depart on their 7-day travel award to Scotland and England.

Keep your calendar open for all steps in the Timetable.

Watch the News Section of *Commodore Magazine* for More Information on the Red Storm Rising Ultimate Challenge.

Reviewed by Mike Rivers

Red Storm Rising

Computer: Commodore 64
Publisher: MicroProse
180 Lakefront Drive
Hunt Valley, MD 21030
Medium: Disk
Price: $44.95

In the quiet cold of the Norwegian sea, a Soviet task force passes before an unnoticed, quiescent observer. It is an improved Los Angeles class nuclear submarine armed to the teeth with the latest in conventional submarine armament. At the proper moment, you—the skipper—unleash a silent lethal visitor, an Mk48 "Swimout" torpedo. Quietly, you order your sub to dive beneath the ocean's surface duct to further evade detection as you wait for your weapon to seal the fate of a Soviet Kashin class anti-submarine ship.

Red Storm Rising is MicroProse's real-time submarine warfare simulator based on Tom Clancy's best-selling novel by the same name. The complexity of modern submarine warfare as portrayed in the book is impressively reproduced with real-time tactical displays, animations and stills.

The game is split into 11 different scenarios which allow the player to get his "sea legs" and practice different strategies and tactics before taking on the "ultimate" World War III/Red Storm Rising scenario. You can choose one of four time frames between 1986 to 1996 wherein technology and hardware have changed for both the Americans and the Soviets. You then select one of five submarine classes, each of which has different capabilities and weaponry, or you can have one assigned to you by the Naval Military Personnel Command. You have the option to choose the level of challenge for the scenario you will select. "Introductory" for beginners gives you a damage-resistant sub with an experienced crew. The enemy is easier to find and track. "Normal" for casual gaming, features a more destructible sub and a tougher enemy. "Serious" gives you a more intelligent, skillful enemy and a more difficult game. "Ultimate" gives you more "realistic" survivability, a clever enemy and the necessity of identifying a vessel's "acoustic signature" yourself.

The complexity of modern submarine warfare as portrayed in the book is impressively reproduced with real-time tactical displays, animations and stills.



For scenarios, there are two training actions against a sub or a surface ship, nine battle simulations which feature different combinations of ships and subs, and, of course, World War III in the Atlantic: Red Storm Rising.

Animations fill you in on the action leading up to conflict from the novel. Then your mission orders are given, and you choose the type and amounts of armament you'll use. For the Red Storm Rising scenario, you are shown the "Strategic Transit" map. How you use this map will determine your speed, depth and orientation to the enemy when the scenario starts. After engaging the enemy (it's best to quietly lay in wait for them if you can), the screen switches to a tactical display. From here you control all your sub's detection, evasion and weapons systems. Weapons systems can include three types of Mk48 programmable, wire-guided torpedoes, harpoon underwater guided missiles, Tomahawk anti-ship and land attack missiles, Sea Lance/Mk50 missiles and FIM-92A Stingers. Some weapons and sub classes are unavailable during certain time frames. Sensors include active and passive sonar, towed array, active and ESM radar. Missiles and torpedoes must be loaded before being fired, and this takes some time. This feature really adds to the fun when you find you've forgotten to load your tubes, and you discover you'd really like to fire something *right now*.

Displays can be zoomed in and out, maps overlayed, decoys and "noisemakers" deployed, and a host of other functions activated, all of which underscore the abundant detail included in *Red Storm Rising*.

Divided into three sections, the manual is superbly written. Reading it is as much fun as playing the game. Part One, the Operations Manual, describes the various starting options and controls. There are succinct, easy-to-understand descriptions of weapons, detection and evasion systems interspersed with useful technical information regarding their capabilities. This information is also summarized, highlighted and conveniently located throughout the text.

Part Two, the Captain's Manual, has a briefing on the Norwegian Sea theater. This is a particularly interesting description of the geographic and oceanographic concerns of a nuclear sub commander in northern Europe. The "Strategic Maneuvers" section describes classic techniques for finding and engaging the enemy and a discussion of the composition of Russian task forces. "Use of Sonar and Sensors" is replete with short technical descriptions of sonar response strategy in a variety of sea conditions. "Weapons and Attacks" contains practical suggestions on tactical use

Continued on page 73

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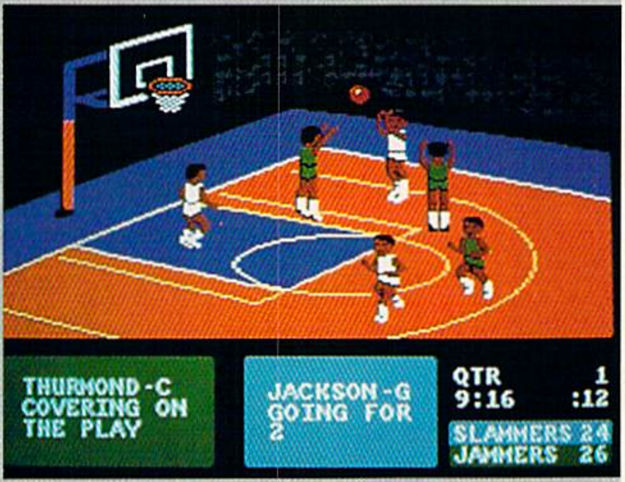
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Fast Break

Computer: Commodore 64
Publisher: Accolade, Inc.
550 S. Winchester Blvd.
Suite 200
San Jose, CA 95128
Medium: Disk
Price: $29.95

One of the top advantages of having three players per team is the ability to execute pro-style play patterns.



More than any other software genre, sports games are genuinely competitive among themselves. One game always sets the pace for others to follow and, hopefully, surpass.

With *Fast Break,* Accolade takes a solid shot at the current champ—Gamestar's *Two-on-Two*—and nearly grabs the title. Designed by veteran Steve Cartwright *(Hacker, Aliens), Fast Break* represents a slightly flawed but tremendously enjoyable effort.

The game loads in a flash and immediately displays three play options: quarter length (three, six, nine or twelve minutes), team selection (one or two players), and game mode (competition, practice or Playmaker).

Pick fast to avoid prolonged exposure to the game's obnoxious "sound track"—a dull, skull-pounding simulation of feet stomping on bleachers. Authentic perhaps, but about as enjoyable as the screech of fingernails on a blackboard.

The two "house" teams—the Slammers and Jammers—feature a roster of six players, each with unique strengths and weaknesses. Some are masters of the outside shot, while others perform best under the net. Some are crack ball handlers and others, well, cross your fingers. Although two players are trained for each position—center, guard and forward—coaches can only activate one at a time to fill their three-man lineups. Ideally, both teams are evenly matched. Only time will tell which team feels right for you, and what combination of players works best.

The program keeps a watchful eye on each player's performance throughout the game. Statistics are kept on field goals, personal fouls, steals and turnovers. Player substitutions are made during timeouts (six per game) and at the end of each quarter.

One of the top advantages of having three players per team is the ability to execute pro-style play patterns. In this area, *Fast Break* outshines the competition. Each team controls identical playbooks stocked with 14 offensive and five defensive routines. As coach, you can select up to four offensive plays at a time, subject to change during each time-out.

In addition, Accolade's new Playmaker option allows each team to design a unique play before the game begins. Playmaker is easy to use and adds yet another dimension to the game. Unfortunately, only one design can be used per game.

The game boasts a raised three-quarter profile view of the basketball court. Although relatively simple in design, several audio-visual embellishments stand out. Mixed ever so slightly among the usual sound effects—bouncing balls and crowd cheers—listen for the squeak of Nikes™ on polished wood. A nice touch.

Although only one half of the court appears on screen at a time, the game features amazing interaction between the two. Players can pass the ball across center court—off the screen, basically—to teammates waiting on the other side.

Paradoxically, ball control is both the game's best asset and its greatest flaw. Responsive joystick controls offer tight ball control and quick passing. Transitions—changing control from one player to another—are also smooth as silk. Skillful teamwork results in flawless ball manipulation.

Unfortunately, *you* are the entire team. Except for one-player games, there are no computer-controlled players in *Fast Break.* And except for simple pattern execution, the game shows no signs of intelligence whatsoever. Your teammates never take the initiative to steal, shoot, pass, block or rebound the ball.

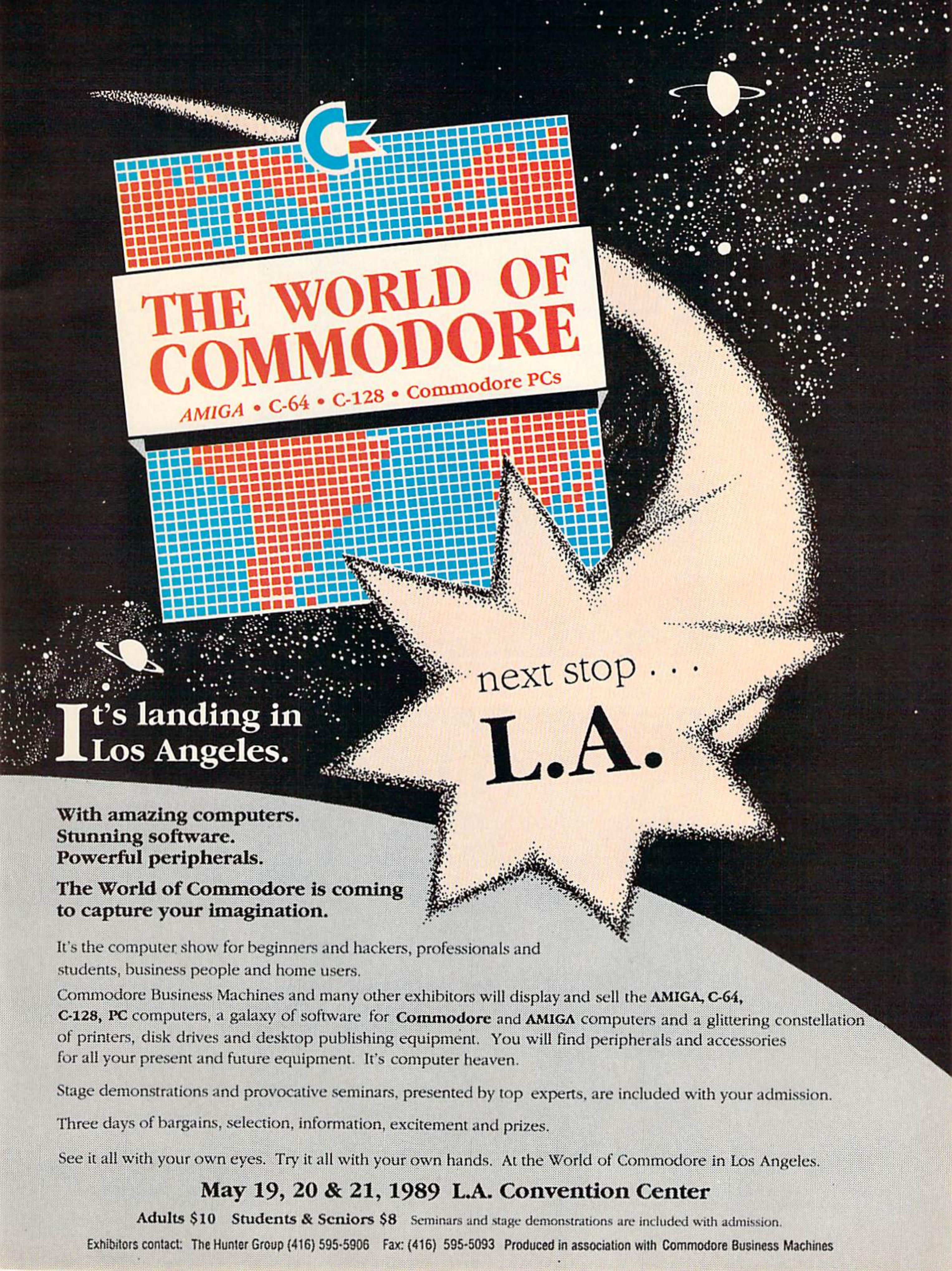
This curious lack of intelligence represents a major oversight. During one-player games, for example, the computer rarely attempts a rebound. Human players shooting from far outside can typically rebound their own shots. Other shortcomings threaten to spoil the fun: although there are fouls, there are no free throws. The manual—itself almost sickeningly cute—says "free throws are for wimps." Tell that to Larry Bird.

Having six players bounce around the court at once can also create a visual nightmare. The "active" player on each team is indicated by a flashing white uniform. In the heat of battle it's often impossible to determine who's who until you lose possession of the ball.

Such flaws would surely bury a lesser game. Incredibly, *Fast Break* transcends these barriers and emerges as one of the best in its league. Despite the computer's seeming lack of aggression, solitaire games are quite challenging. Increasing the game's time limit introduces a fatigue factor, an effective substitute for variable computer skill levels.

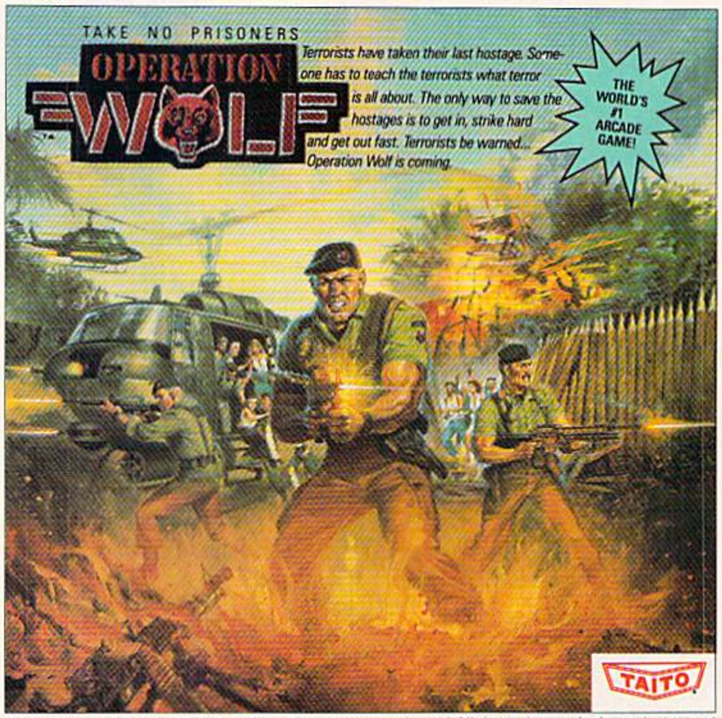
Naturally, two-player contests among

Continued on page 37


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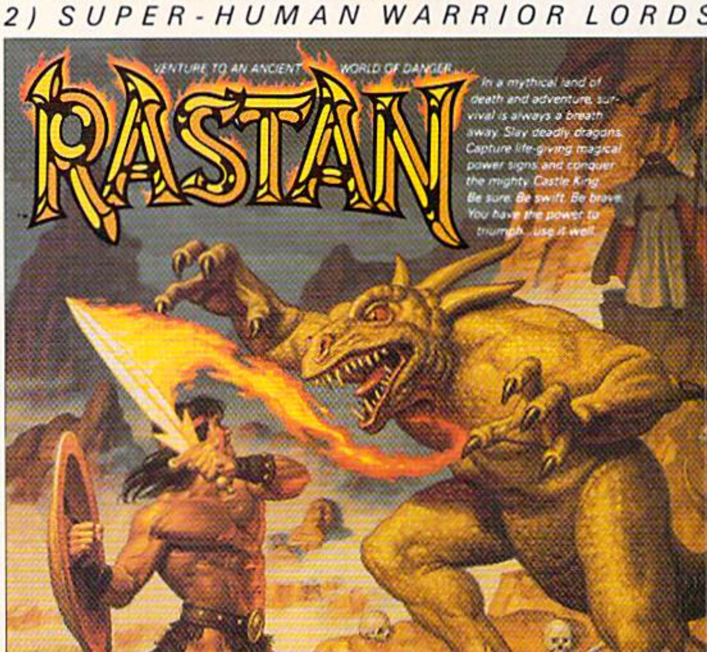
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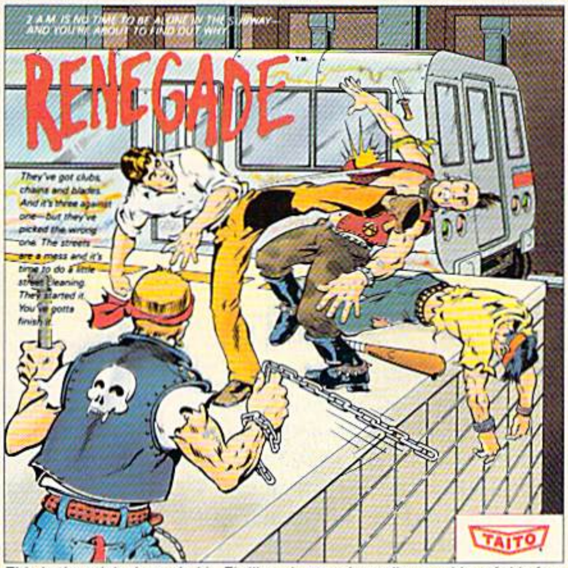
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Reviewed by Gary V. Fields

Monopoly

Computer: Commodore 64
Developer: Leisure Genius
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Medium: Disk
Price: $29.95

Beware, the computer shows even less mercy for you when you are down and out than your older sister did.



The game Monopoly was born in the midst of the Great Depression, and after more than 50 years it continues to be one of world's favorite board games. The original game was created in 1935 and in the past 54 years has been played and enjoyed by nearly every person on the North American continent. Through that half century, people have been attracted to it because it allows us all to try our hand—through luck, cunning and ruthlessness—to acquire a fortune in money and property. The game generates a miniature world where you can buy, sell and rent your way to a fortune. Your holdings enlarge or deflate at the whim of fate as dealt by the roll of the dice or draw of a card.

Is the game's translation to a computer an improvement or simply an effort to open a new market with an old product? The board and computer versions look almost identical. The familiar eight tokens (dog, thimble, hat, race car, shoe, iron, horse and wheelbarrow) are here in the 64 version. The playing field, shown in 3D, is perfectly produced here and includes those familiar squares, colored property bars and symbols we grew up with—even the mustached face of the rich fellow in a top hat is displayed.

Two to eight players can play the game, and if you wish one of the players can be the computer itself. But beware, the computer shows even less mercy for you when you are down and out than your older sister did.

The game commands are issued via a menu bar which lists: Quit, Save, Mortgage, Owners, Houses, Trade, Rent, Dice, Fastmove and Cash. These commands can be issued by either typing the first letter of the name or highlighting a command with either a joystick or the cursor keys. The mortgage command lets you buy or sell property. If you can't pay for bills, this option will automatically be activated so you can mortgage selected property to pay your debts. Owners shows which property is owned by which player. Houses is activated when you want to buy or sell houses or hotels. The Trade option lets you swap property with another player in order to achieve a monopoly, so you can improve the property and raise the rent. The Cash option is a toggle command which causes each player's total wealth to be either hidden or displayed. The Fastmove option is another toggle command which lets you move around the board a little quicker at the expense of less animation. The Dice option (the default option) causes the game to roll the dice (shown on screen using 3D images), and the active piece moved accordingly.

Below the menu is the three-dimensional playing field—it looks exactly like the one which comes with the board game. When a player's token is moved, its image scoots around the board just as if it had been moved by hand. To the left of the board is the name of the player whose turn is up along with the symbol which represents his token. To the right of the board appears a clock, providing the players have decided to restrict play to a fixed amount of time. Although you can play until all but one player goes bankrupt, I was happy to see the option to restrict play to only a certain amount of time. Having suffered the ill effects of losing sleep playing a marathon game of Monopoly, I refuse to play anything but a timed game now.

Below the playing board are four boxes which serve as a window showing the current position of the player whose turn is up along with the next three spaces in front of him or her. These boxes scroll to the right as the playing piece is moved on the main board. To the left of these is a property card showing the information about the square the player finishes his turn on: who owns the property, how much rent costs, the price of house and hotels, etc.

Along with the colorful realistic graphics are some pleasant sound effects which add to the game's fun including train toots, sirens for jail sentences and enthusiastic music to signal payday when you land on GO.

The 64 version of Monopoly plays exactly like the board-based game. But where the computer game excels is in the way it handles banking and property transactions. Rather than having to shuffle and handle paper money and property cards, the computer, serving as both banker and referee takes care of all the tedious jobs. Plus the computer never cheats, miscounts money or makes up new rules. I loved the ability of the computer to diffuse rule-generated arguments. There is no need to argue here—the computer knows the rules and enforces them equally for all players.

To hold true to the original game, payment on rental is not automatically collected. If someone lands on your property,

Continued on page 103

Reviewed by John Ryan

Typhoon of Steel

Computer: Commodore 64
Publisher: Strategic Simulations, Inc.
1046 N. Rengstorff Avenue
Mountain View, CA 94043
Medium: Disk
Price: $49.95



War gamers have never had it so good; there are literally hundreds of very good electronic battlefields out there for the taking. Strategic Simulations, one of the world's foremost publishers of computer-based war games, salutes you, the war gamer. To that end, they have released *Typhoon of Steel,* a World War II squad-level war game.

Typhoon of Steel is billed as an advanced level war game. If you're just a casual user the program could be a bit too difficult to handle, much less master. The documentation and statistics involved with war gaming can be overwhelming if you are new at it. If you *are* new to this particular genre, then maybe you should first try one of SSI's beginning or intermediate war games before moving up to the more advanced scenarios.

Conversely, seasoned veterans should delight in the plethora of options and detail this program has to offer. Unlike some other games, *Typhoon of Steel* presents all the features you'd ever want in a war game, but doesn't try to cram it down your throat. You select the scope of operations.

Typhoon of Steel—a sequel to the very popular *Panzer Strike!*—gives you the options of commanding engagements in the Pacific, Asian or European theaters. You also have the option of building your own scenarios should you tire of the game's (unlikely, for a time). This "construction set" type of setup is very flexible and easy to use.

The program comes with two double-sided diskettes, as well as two manuals to help you wade through the specifics of game play. While, historically speaking, war game documentation can be as interesting as an encyclopedia index, *Typhoon of Steel's* program manual hits quickly on the mechanics of game play and avoids bogging you down with myriad facts and statistics at the outset. So if you're itching to get into battle, chapters one and two will give you everything needed to jump into the game without a lot of fuss.

On the other hand, if you're the type of war gamer who thrives on raw detail, game formulas or precise unit data, you will undoubtedly want to read over the remaining chapters. In light of that, the second manual is comprised solely of unit data on American, German, British and Japanese equipment. This manual details specifics on everything from a main battle tank to a jeep (size, speed, crew, class, range, cost, and so on), and probably contains every weapon and vehicle ever used in World War II! It is quite extensive. Additionally, the Briefing Manual's 15 pages break down and explain examples of chain of command, offer briefing notes on the program's own scenarios, and include a detailed terrain effect chart. Obviously, you could spend as much time in the documentation as with the game itself.

The opening menu gives you several options. *Typhoon of Steel* can be played by either one or two players, or you can watch the computer play against itself. Players must also choose whether to play Allied or Axis powers, select a handicap level, set message delay lengths, and decide whether or not to invoke a limited command rule, which essentially limits the number of orders a unit's headquarters may issue during a turn. The program has over a half dozen historical scenarios from which to choose, or you can create your own. In any case, you must decide to command a single battle or start a campaign game that will stretch over several scenarios.

Typhoon of Steel's play is divided into Orders and Combat phases, and learning how to properly issue orders is the key to success. Much emphasis is placed on command and control, and chain of command. This war game, like most others, is completely menu-driven and ranges over scaled maps which represent the historical terrain of past battles or terrain you have constructed yourself. You can view a terrain map at the tactical or strategic levels. At the tactical level, a 20 × 10 square portion of the map is displayed, which gives you, as commander, a close-up look at terrain and enemy positions. The strategic map, measured 40 × 20 squares, can be used to gain the "big picture" for overall objective planning. Both maps encompass a 60 × 60 area, where each square represent 50 yards, and you can easily toggle back and forth during play.

The Orders phase of the game is where most of the grunt work is accomplished. There are four options within the Orders phase: movement, fire, organizational and cancellation phases. Most orders are issued by gaining access to them from the map menu. This map menu allows access to information relating to the battle area as a whole. A Unit menu, however, is used to access information or issue orders to a particular unit or group of units. Generally speaking, issuing orders usually involves invoking the map menu, then initiating options to gain control over selected units under the unit menu. In practice, the flow of control from strategic level to unit level is smooth and logical.

During the Orders phase, units may be moved and objectives—offensive or defen-

sive—defined for individual units. If you are involved in a long or large campaign, you may even opt to let the computer handle your army's movement, though the computer's automatic placement may not be the best for your strategy. Moreover, the computer can also be set to issue orders on your behalf for part or all of your battle force. Indeed, *Typhoon of Steel* employs a very flexible system.

The pre-defined scenarios all have a select objective in mind. Meeting this objective wins the scenario. These objectives include holding, bypassing or engaging the enemy. You must always keep these objectives in mind during the Orders phase. Why run your tanks down to the enemy's doorstep during a holding objective? Unless you have got some good reasoning behind such madness, conservative and thoughtful play will normally keep the game going on an even keel.

Even so, war is always an unpredictable animal, and you may notice hiccups in your strategy soon after Combat phase begins. While the game is played in "turns," each combat phase is executed in "pulses," where artillery and mortar are released, units moved, and damage assessed. Like the real world—or so I'm told—you can't just jump in and make quick changes during combat. Issuing new orders takes time, and during the heat of battle a lot of things can happen before new orders can be acted upon. For this reason, during the combat phase, a player must wait four full pulses before trying to enter the Orders Phase again. Believe me, three pulses can seem an eternity, especially with your rifle squad pinned down and your last mortar battery taking a beating from off-map artillery.

Sadly, war games have never been known for their eye-boggling graphics, and *Typhoon of Steel* is no exception, though the graphics are effective, clearer and sharper than most other war games I have played. Most of the unit icons are easy to identify on the tactical map; on the strategic map, however, some icons and terrain features can be rather obscure. Since the maps cover much more area than the screen can depict at one time, there is a lot of scrolling involved, especially as off-map enemy units fire on you. This is because the program must scroll back and forth between the Axis and Allied positions to highlight the source and target positions. While the screen updates are not are impressively fast, they are acceptable. Some would argue that graphics do not the war game make—and I tend to agree. On *Typhoon of Steel*'s side, the graphics are certainly better than most, and complemented by sound that can aptly be described as very basic, but also effective.

Once you've had the chance to play the game's scenario, you can move on and build custom scenarios and maps of your own. Doing this involves selecting the option from the main menu, building your map, then answering a series of questions about your scenario: selecting units, choosing which side to play, selecting a handicap level and invoking several other options as the computer presents them. Once a map has been built, you must begin the process of selecting a type of battle to be fought and editing your forces to be placed on the map. Realistically, building a scenario could take several hours to accomplish, depending on how far you want to take it. For quick, random scenarios, the computer can be counted on to do much of the dirty work.

Typhoon of Steel is not a game to approach with just an hour or two of spare time on your hands. It is a serious program, dedicated to the serious war gamer. The player interface is logically laid out and seems to follow many of the conventions set down by other SSI war games. Whether you are a battle-scarred veteran or an up-and-coming young foot soldier, this program is a definite must-have. ■

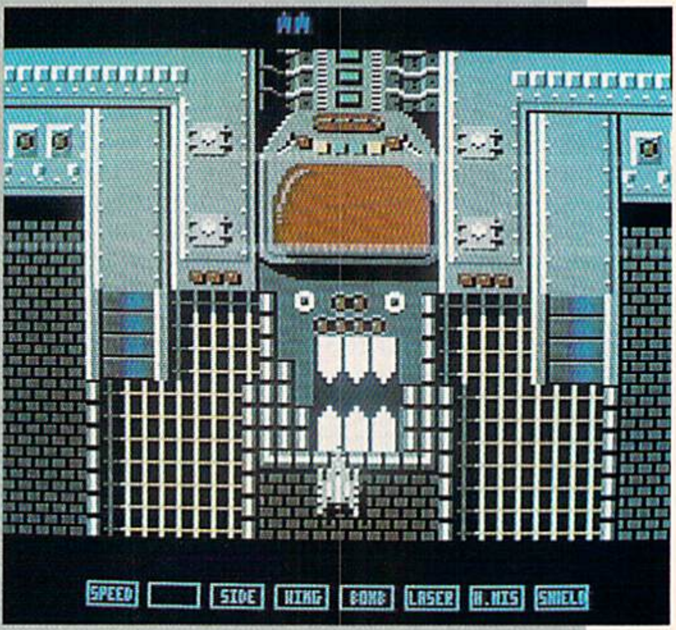


Reviewed by Scott A. May

Alcon

Computer: Commodore 64
Publisher: Taito Software, Inc.
267 W. Esplanade
North Vancouver, B.C.,
Canada
Medium: Disk
Price: $29.95

The pressure put on players is incredible, taking this game far beyond typical slide-and-shoot contests.



Here's a familiar phrase that strikes fear in the hearts of most dedicated software buyers: "Arcade screens shown. Actual computer screens may vary." Gulp. You know what that usually means—put the box back on the shelf and walk away.

No so with Taito, the arcade giant who recently hit the home front with a line of coin-op translations that will knock your socks off. Although the above phrase does indeed appear on the company's software packages, proceed with full confidence. If their initial releases are any indication, expect nothing but outstanding entertainment from Taito.

In the "look and feel" department, *Alcon* is one of the best coin-op conversions I've ever seen. The graphics are sharp, and the game play silky smooth. Don't even bother putting this one away—you'll want to play it every time you boot up.

Alcon is a one-player shoot-'em-up for arcade purists. It comes from the seat-of-your-pants school of non-stop video combat. To survive you must think fast and react even faster. The only strategy that counts is the one that keeps you alive another minute.

Don't expect a convoluted plot or long instruction manual here. In true arcade fashion, the story takes a back seat to the action. In fact, the software packaging gives only a hint of the game's basic scenario:

It is the year 2059. Humans are living in exile on the planet Theon following an alien invasion of their last home, Orac. The Allied League of Cosmic Nations (Alcon) has determined that Orac will be lost forever if they do not act immediately.

The Alcon supreme council has decided to send you on a mission to reclaim Orac and liberate the humans held hostage there. At your command is the SW475, an experimental starfighter with a wide range of powerful weapons and defense systems.

The title screen offers players the option to have music, sound effects or both. The game features a full-sized vertically-scrolling play field depicting the planet surface. Players begin the game with only three spacecraft. Additional lives are awarded at 50,000 and every 70,000 points thereafter. The number of remaining ships is displayed at the top of the screen, along with the current score. (On my copy of the game, the score was placed well off the top of the screen, rendering it unintelligible.)

The scrolling landscape is lush with detail and color. The top-down graphics feature dense textures and 3-D shadowing. Set against this ever-changing world is your starfighter. Joystick controls allow tight, responsive movement in eight directions. Although your ship can zip to any portion of the screen, smart pilots should stick to the lower middle section. Aliens often appear suddenly from the top and sides, moving quickly with lasers blasting. Any contact spells instant death.

The game begins innocently enough, with single alien saucers occasionally backed up by stationary gun emplacements. Within minutes the action increases in frantic proportions. Aliens begin to attack in groups of five or six from different areas of the screen.

The best tactic is to perform a decisive horizontal sweep across the screen, blazing away with your rapid-fire cannons. Concentrate on the aliens whose path you are most likely to cross. Simply avoid the aliens moving along the outer fringe. Going out of your way to kill them only places your ship in danger.

Aliens fire in single bursts that home directly on your last location. For this reason you must move constantly and quickly to avoid being hit. The game's greatest challenge often stems from the instantaneous attack of multiple alien craft in several different directions. Only lightning-fast reflexes will allow you to escape the deadly wall of laser fire.

The pressure put on players is incredible, taking this game far beyond typical slide-and-shoot contests. Players must avoid incoming salvos, return fire, and dodge alien craft—all within split seconds of each other. The action never lets up. It only gets faster. This can be a physically exhausting game.

Although the advantage always favors the aliens' side, we pitiful humans have several tricks up our cosmic sleeve. The SW475 Starfighter comes equipped with eight special features to aid the cause. Some aliens leave yellow stars behind when destroyed. Collecting stars highlights the following options at the bottom of the screen: Speed, Shot, Side, Wing, Bomb, Laser, Homing Missiles and Shields. To obtain laser capability, for example, you must collect six stars. Pressing the spacebar engages the highlighted feature.

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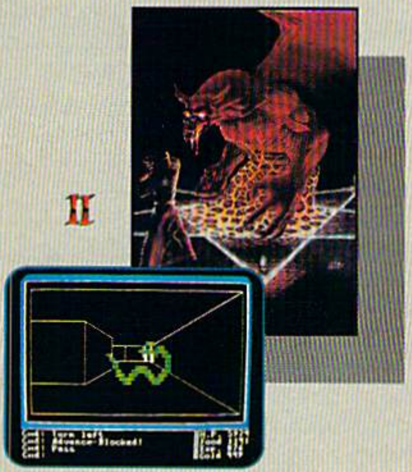
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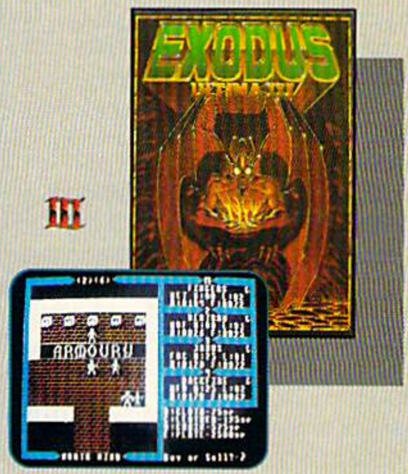
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Reviewed by Mark Cotone

Award Maker Plus

Computer: Commodore 64
Publisher: Baudville
5380 52nd Street SE
Grand Rapids, MI 49508
Medium: Disk
Price: $39.95



One of the most satisfying rewards one can derive from a job well done is recognition, some sort of expressed confirmation serving to assure that all of the hard work has been noticed and appreciated. In some of our more substantial triumphs, a trophy or document might even be presented to mark the occasion—a merited prize to be cherished and proudly displayed. But most of the time, with life's smaller, less ceremonious challenges and victories, a pat on the back and a few congratulatory words are all we've come to expect and accept. All deserved fanfare can be fleeting if not totally forgotten.

But hold your head high, a change is on the horizon. For with Baudville's release of *Award Maker Plus*, every achievement big and small can now be noted, applauded and officially rewarded. Think back over the past week at all of the accomplishments of friends and family that slipped by virtually unnoticed. How about the student who spent the entire sunny weekend studying for Monday's big test, your friend who helped move the sleeper sofa upstairs, or your spouse who pulled off the dinner party without a hitch? Sure, you've told them all how grateful you are, but what about taking it a step further and actually showing them? With *Award Maker Plus* and a few strokes of your Commodore keyboard, you can now present them all with a professional-quality award certificates; gold seal documents suitable for framing and simply begging for placement on some prominent wall space. It's a lasting keepsake they'll treasure and proudly exhibit, and it can all be produced in a matter of minutes.

The creation process starts in the Award Style Catalog, a 32-page booklet listing the 286 different certificate types available. Every conceivable style is represented, from the starchy and official-looking linear document to the amusing, graphic-laden tongue-in-cheek prizes. There are awards for academic accomplishments (Science Award, Student of the Week, Honor Roll, Diploma), family celebrations (Anniversary, Queen for a Day, Official Best Friend), sports feats (Most Improved Player, MVP, School Record, Personal Best), and humorous offshoots (Party Animal, Divot King, T.G.I.F., Murphy's Law), to name a few.

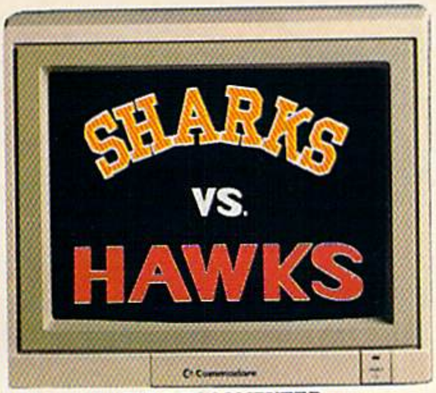
And if by chance some obscure or esoteric area of commendation can't be found in the extensive pre-designed list, one can always create a customized piece in the General Awards section, where document parameters are wide enough to handle any other achievement worth noting. It is in this final catch-all category where we also discover the meaning of the "plus" in this product's title. While flipping through the pages of the various General Award styles, it becomes apparent that many of the certificate dimensions would lend themselves to uses slightly removed from the "award" heading—like coupons, raffle tickets, titles or licences. Feel free to experiment. The possibilities are virtually limitless.

Once a specific style has been decided upon, its corresponding award number is entered and the program takes over, using on-screen prompts and option menus to painlessly guide you through every phase of construction. Many of the steps involve the old fill-in-the-blank exercise, where you merely type in information like the recipient's name, the date and name(s) for the signature line(s). But there are a few areas where the creative juices are invited to flow, allowing each design to become a personal product.

First there is Font selection, where the user is asked to pick a desired text style from four possible choices—Old English, Script Italic, Book Serif and Modern. The award's class will usually suggest an appropriate font style, with the catalog assisting by illustrating the full face of every certificate. But the user is usually free to select whichever font he wishes.

When the preferred text style is keyed in, it's time to pick a document border. Here the choices are wide open. On disk, Baudville supplies ten different official-looking borders of its own. If the style names—like Trefoil, Trellis, Laurel and Labyrinth—don't conjure up specific images of each intricate design, one only needs to glance at an on-screen style sampling to immediately recognize their look and effect. And just in case you'd like to add a specialized slant to your award, this program will even allow for the importation and use of any graphic from Broderbund's *Print Shop* program. By simply taking the borrowed graphic and repeating it around the certificate's edge, *Award Maker Plus* can instantly create a unique frame for any occasion.

Continued on page 110



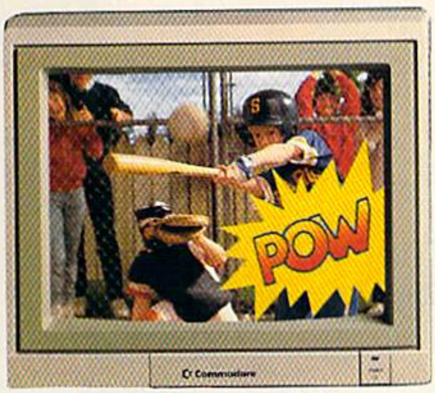
FADE IN COMPUTER-GENERATED TEAM LOGOS.



CHECKERBOARD WIPE REVEALS STAR PLAYER.



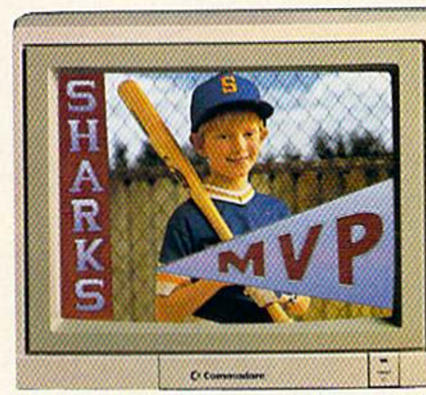
SUPERIMPOSED TITLES DISPLAY STATISTICS.



COMIC BOOK EFFECT POPS ONTO SCREEN.



ANIMATED BASEBALL FLIES TOWARD VIEWER.

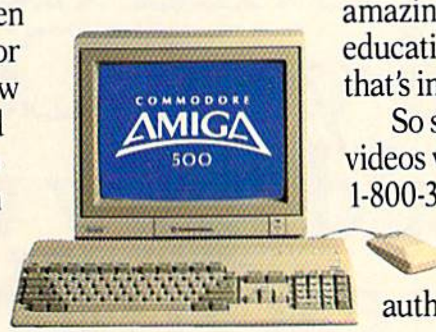


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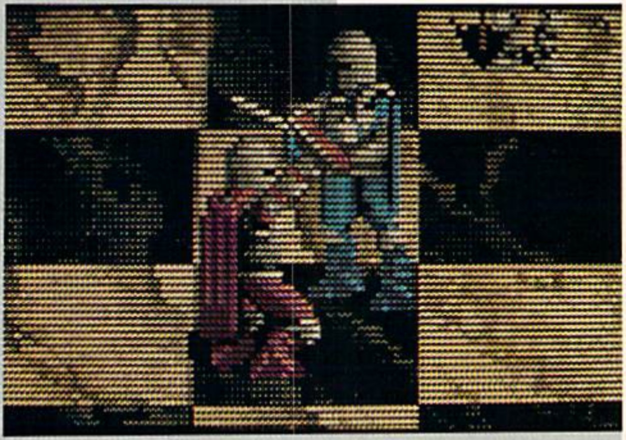
Add new life to your Commodore.

Reviewed by Ervin Bobo

Battle Chess

Computer: Amiga
Publisher: Interplay Productions
1575 Corporate Drive
Costa Mesa, CA 92626
Price: $49.95

Think of it as an entry-level computer chess game designed by rabid Monty Python fans.



In *Monty Python and the Holy Grail* (according to my Monty Python expert) the Black Knight is challenging all who would cross his bridge. King Arthur dispatches him by first severing one arm, then the other. As the knight stands helpless, Arthur severs one of his legs. The knight hops about until Arthur removes the other leg. Still upright and still nasty (though much shorter of stature and reach) the Black Knight is finally disabled.

A similar sequence occurs in *Battle Chess* when the Red Knight fights the Blue Knight. I point this out not because I consider it imitation, but because I consider it a tribute. It is also the key to *Battle Chess:* If you think of it as an entry-level computer chess game designed by rabid Monty Python fans, you'll be very close to appreciating it for what it is.

Consider this: Your king's bishop pawn stands at rigid attention in the center of the board until the opposing queen moves toward him. He walks to the near corner of the square, taking up a defensive stance. The queen raises her hand above her head and a bolt of fire or magic hits the pawn, who somehow survives. As though he can't believe his good fortune, he looks over his shoulder at you, then turns and tries to run away. The queen casts another bolt of magic and the pawn, who has progressed only one square in his headlong flight, and he's reduced to ashes (which are magically vacuumed away to leave the board neat and clean).

That's *Battle Chess*, and it's one of the most innovative games of recent memory.

Comparisons to *Archon* will come to mind, but they can be dismissed. In *Archon* the pieces fight for the square and the stronger—or the one best controlled by a joystick—wins. *Battle Chess* follows accepted and conventional rules: the attacking piece will win, no matter what its rank, and the end of each individual battle is a foregone conclusion.

Because of this, *Battle Chess* functions as a true computer chess game that can be played against the computer or against another human via modem or serial cable. On another level, it functions as an introduction to chess and as a teaching tool.

Controlled entirely by the mouse, the game uses flashing borders on the squares to help you select a piece and to show where that piece may move. Put the pointer on a square, click the leftmost button to select the piece, then move the pointer about the board. Each square that is a legal destination will flash, letting you know where the piece may be placed.

When you click on that destination square, *Battle Chess* shows off its distinctive style: The piece selected will walk there, the men stomping heavily in their armored boots, the queen seductively swinging her hips. And when battle is joined, you'll hear the grunts and groans of the fighting men.

Playable on ten levels of expertise and with a library of 30,000 opening moves, *Battle Chess* is as smart as most other computer chess games and, at its highest level, may take as long as 21 minutes to consider a move. If you're impatient, you can use the Force Move feature to cut this time short and make the computer take the best of the moves it has so far considered. At novice level, the computer looks at the board only once and so moves are made faster.

Other options include viewing the board in 2-D; setting the board for a particular problem; saving a game in progress; and choosing the color you wish to play.

Teaching features include the ability to take back a move or to have the computer suggest your next move. As further evidence that *Battle Chess* was designed as an entry-level game, the documentation is solely concerned with teaching the game of chess. To learn how to play *Battle Chess*, you'll have to consult the quick-reference guide.

After my first day of playing the game, I began to question its longevity. How many times would I really enjoy seeing these pieces march across the board and engage in a battle whose conclusion was foregone? Would the gimmick of animation wear thin?

I don't think that's going to be the case with *Battle Chess*. There are variations in the battles, and some of the pieces seem to have personalities. Even if this were not so, consider that in a traditional game of chess you wait for your opponent or your computer to make a move; the move is made; then it's up to you. With *Battle Chess*, there is at least a kind of "between-the-acts" entertainment.

This entertainment does have a price. Because of the animation involved, there will usually be a pause for disk access while the computer drags out the proper routine to fit the situation. This has the effect of lengthening the time between moves but is well worth it.

What you may lose after repeated plays is the element of surprise. There is one

Continued on page 37

Reviewed by Mike Rivers

Captain Blood

Computer: Amiga
Publisher: Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062
Price: $49.95



All aliens have different psychologies, behaviors and gripes that must be understood in order to get information and other planetary coordinates.

Step right up, science fiction fans! Mindscape has an outstanding new entry in the interactive adventure market. *Captain Blood* features spectacular graphics, speech and sound effects, a unique user interface, fractal landscapes and theme music by Jean-Michel Jarre. As soon as you boot up, you know this game is different. But, be warned, *Captain Blood* is *absorbing*.

The premise of *Captain Blood* makes interesting reading. You are a game programmer who goes by the pseudonym "Captain Blood." Blood has programmed the ultimate sci-fi adventure, complete with 14 species of aliens and 32,768 *different* planets. (Arr mateys! Get ready to sail the silicon spaceways!) While compiling his program for the final time, Captain Blood gets drawn into the program by an unknown force (I hate it whenever that happens to me) and finds himself in the universe he created, Hydra. Unfortunately for Blood, his genetic structure has been fragmented and scattered all over Hydra in the form of five clones.

Meanwhile, his body parts are slowly being replaced with auto-bionic parts from his own Geiger-like ship, starting with his right arm (which takes the place of the mouse pointer). The only way to stop this process is to find the clones one by one, teleport them on board the ship inside the "Frigitorium," (a kind of combination suspended animation device/bug-eyed monster distillery) and then drink their vital fluids. Captain Blood has approximately two and a half hours to locate a clone and get back some vital fluid before his arm becomes uncontrollable.

Finding the clones is, of course, no easy task. Clues to their whereabouts can only be discovered by talking to the various aliens in the game. All aliens have different psychologies, behaviors and gripes that must be understood in order to get information and planetary coordinates.

With over 32,000 planets, you can fly around forever and never find a sentient race. Because of this, it's a good idea to write down your starting coordinates before going anywhere. You'll never find your way back otherwise.

To find aliens, you must drop a remote exploration unit, called an "OORXS," onto the surface of the planet and pilot it to a landing site. Sometimes your progress is hampered by enemy missiles which track your OORXS. To avoid the missiles you must fly as close to the ground as possible.

Once you have successfully negotiated the narrow canyons that lead to the landing area located on each planet, the OORXS lands, and you immediately meet an alien if the planet is inhabited. The first planet in the game is always inhabited.

The means of communicating with aliens is where *Captain Blood* really shines. Conversation is facilitated via the ships' UPCOM (Universal Protocol of Communication) which consists of 120 icons which you can sequence into complex sentences. Icons are automatically and continually translated by pointing at them. The result is a sort of pidgin English which enhances the sci-fi quality of the game. A typical exchange might go like this:

Alien: "Planet equal Trap 4. Me great warrior Dead Genetic. Me not like you (curse) (insult)."

Blood: "You not help me, me destroy planet (laugh). You go brain spirit. You say coordinate planet Migrax."

Success depends on your ability to correctly interpret what the aliens are saying. Aliens can be very cooperative and offer plenty of information, or they can be downright stubborn—or worse—seemingly incoherent. If you manage to get a set of coordinates from the alien, then you can find your way to another inhabited planet, another alien and new information.

Travel between planets is accomplished by setting the coordinates of your destination on the galactic map (a superbly-drawn graphic) and pressing the "hyperspace activator." After a brief moving starfield segment, the viewscreen becomes a spectacular animated kaleidoscope which is interesting to watch and imparts a sense of inter-stellar travel. At first, I felt the hyperspace and OORXS segments were a bit long. After a while, you realize that this is an inducement to be more communicative with the aliens, and after all, space travel *is* time consuming.

Sooner or later, an alien will ask that you destroy an enemy's planet. Under certain circumstances, this may be an appropriate course of action. Sometimes the aliens can be so insulting you may want to blow them up whether it's appropriate or not. Either way, this segment makes ex-

cellent use of the age-old science fiction device of "space-dog dispassionately destroys alien planet." What fun! Die, you accursed space-scum!.

The game is won after all five clones are located and their vital fluids absorbed. The fifth and final clone gives you the location of Torka, the Ondoyante. Once teleported aboard your ship, she presumably helps you find your way out of the game—or she doesn't. Let's put it this way, I guess the good Captain won't be needing the UPCOM anymore.

When playing *Captain Blood*, keep a blank data disk handy. Don't try to finish the game in one sitting, the graphics are too good to risk "player burn-out." Four or five planetfalls are enough for one session, and there's plenty to reflect on between games. Have a pen and paper handy to take notes; there's a lot of information to keep track of. New planetary coordinates are generated for every game, so no two games are exactly alike.

Although *Captain Blood* has a pleasingly-short learning curve with a big play-value payoff, read the manual and tip pamphlet, and keep them nearby for reference. In the meantime, give my regards to Torka. ■

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battle that pays homage to a scene from *Raiders of the Lost Ark* and another involving quarterstaffs that may owe a debt to Errol Flynn's *Robin Hood*. Part of the enjoyment of such scenes is the first thrill of discovery and recognition, and that will be gone on the second viewing. Even so, not every scene will occur in every game, and given the almost infinite variations possible in chess, most games played will seem like new experiences.

Battle Chess can be played by two players through a modem or serial cable connecting two computers, the baud rate is set at 300. You can also communicate by keyboard during the game: as you type your message ("Hah! Gotcha!"), it is displayed in a window at the other end of the line.

In spite of the minor drawback of possible repetition of scenes, *Battle Chess* is one of the better games of the season, and it is truly innovative. Both sound and animation are superb, the designers have taken extra steps to make a game that is both fun to watch and fun to play. And while it functions well in teaching the game of chess, it is smart enough to challenge most of us for years to come. ■

Continued from page 20

comparable opponents are the best. In the hands of expert players, the game unfolds smoothly from the opening buzzer and continues at a lightning pace. Precise ball-handling, passing, play-calling and shooting can set the court ablaze.

Although basketball is a team sport, *Fast Break* puts all the pressure on a single player: you. *Fast Break* stumbles, but recovers nicely to emerge a thoroughly entertaining sports contest.

Here are a few tips for creative ball handling:

- When in doubt, pass. The other team has no qualms about ripping the ball from your hands. Keep the ball moving to cast a spell of confusion on your opponent.
- Play your team according to their strengths. Don't force good inside players to try three-point shots.
- Following a three-point attempt, immediately transfer control to a player close to the net for a rebound and possible slam dunk.
- Utilize the fast break following a turnover on the opponent's side of the court. If one of your players can't be seen, more than likely he's down court waiting for the long pass. ■

Reviewed by Gary V. Fields

WordPerfect Library

Computer: Amiga
Publisher: WordPerfect Corporation
288 West Center
Orem, UT 84057
Price: $129.00

There is a new library in your neighborhood dedicated to helping you conquer your Amiga data problems. Its name is *WordPerfect Library.* On a single disk is a collection of five programs which can help any Amiga user master the routine productivity problems involving information, files, dates or number handling. Amiga business users (either at home or in the office), will find *Library's* programs—calculator, calendar, file manager, notebook and program editor—perfect, intuitive solutions to those important, but tedious office chores we usually procrastinate tackling.

Notebook

This mini-database provides an easy way to organize information for quick access. To take the intimidation out of data management, each file created with Notebook resembles a card from a file box. Anyone who has faced the chore of setting up and maintaining a database will appreciate how simple this one is to use. Its intuitive design allows anyone who invests half an hour perusing the manual's tutorial to master this database. All of the program's editing and design controls can be activated by either pull-down menus or direct keyboard input. Instant help is available by pressing the HELP key. Add an easy-to-understand 174-page manual, and it is easy to predict Notebook is a database most users will love.

The program does not approach the power of a database like *Superbase Professional* or *DBase,* but is perfect for those of us who simply need quick access to information and don't care whether the database can calculate tax rates or print payroll checks.

Notebook is also easy to manage. Using wordprocessor-like commands, you can search for particular entries. You can sort your data list by simply pulling down a menu and selecting the argument. If you have included a field to contain phone numbers and have a modem attached to your computer, you can even have the program dial the number for you. Database files can also be saved to disk and merged with *WordPerfect* documents to create personalized forms, invoices or letters.

> On a single disk are five programs to help any Amiga user master the routine problems involving information, files, dates or number handling.

File Manager

Because all of the Amiga's DOS (Disk Operating System) management operations cannot be accessed directly from Workbench (with it you can only handle directories and files which have display icons) most users eventually go shopping for a DOS aide. Recognizing this need, WordPerfect chose to include File Manager in their *Library* pack. This program lets the user intuitively handle most of the disk managing chores like copy, delete, move, rename, make directory, etc., which normally require the user to dive into the sometimes-confusing world of CLI (Command Line Interface).

File Manager uses a display window to show the files available for control and a double row of gadgets which let you operate on the selected file by just pointing and clicking. These gadgets include four definable drives which can be either physical (floppy, hard drive and RAM:) or logical (using the disk or filename) and commands which include not only the routine controls but others like "word" and "date" search as well. By highlighting a file or device and then clicking on the required command, the user can quickly move, duplicate, locate, rename or print it. Anyone who has wrestled with CLI will be delighted with the simple DOS controls offered by File Manager.

The single disappointment is that File Manager uses a single window for display while I prefer two. I don't like a single window because the user is restricted to viewing the directory from only one device at a time. To be fair, I know several Amiga owners who use similar DOS utilities and think they are wonderful. So while I'll agree that File Manager does its job well, I'll stick to *DiskMaster* (which has dual windows) until File Manager expands.

Calendar

If time management is ever a problem, you'll appreciate the help offered by *Library's* Calendar program. When selected the screen divides itself into four windows labeled Calendar, Appointments, To-Do and Memo. The calendar window looks exactly like what you would expect—rows of numbered boxes. When you first access the program, the month and date defaults to the most recent date set by your system disk. Because I have designed my startup-sequence to automatically request the date and time, my version of Calendar always begins by displaying the correct day and time. As the computer's internal clock ticks away, the time displayed in the active window is constantly updated.

Beyond simply letting you check the dates either present future or past, Calendar helps you keep track of important dates and appointments. By clicking on the month icons you can scroll forward or backward by months. To jump forward or backward by years, click on the directional icons displayed below the year. To select a specific date, highlight the day of the month you want to examine. Once selected the three windows (Appointments, To-Do and Memo) display any appointments or notes assigned to that day. Use the Appointment section to arrange your daily schedule. There is room for a time as well as a note describing the appointment in this window. The To-Do window lets you input lists of things you want to accomplish during the current day. When you dispense with something on the list, you can check it off, and any unchecked items can be automatically moved to the next working day. The memo window lets you input general text messages to yourself without requiring they be assigned a time.

Beyond just helping you manage your time, the program includes an option to dump the window to your printer, so you can share it with your secretary or post it on your office bulletin board. And if that weren't enough, the program lets you input two dates and it will tell you instantly how many days exist between the two—useful for reminding your wife how many shopping days are left before your birthday.

Calendar's Alarm program can prompt

you from any program, not just one of *Library's* utilities. Once activated you simply tell it which Calendar file to use as reference and then forget it. It will automatically search the file and date you assigned and program itself to report to you when an appointment is approaching. As an example: Let's say it's April 12 and you make an appointment for your dentist at 10:30 on the morning of June 25, 1989. When that date rolls around, any program you are using will be interrupted and a small window will appear displaying the appointment date, time and note. Along with the visual reminder, the program will buzz to get your attention and then proceed to speak the information about the appointment. I love this feature for two reasons: (1) it is a useful, sensible feature which lets the computer serve the user, and (2) it puts the Amiga's synthesized voice to constructive use. I give the programmer a gold star for the inclusion of Alarm in the *Library* collection.

Program Editor

At first glance the program editor may appear to have little use for most users. But don't presume because the word *program* is in the title, this offering is useful to software developers alone. Nothing could be further from the truth, although it certainly would be of interest to any programmer, since it includes an option to edit either alpha/numeric or HEX code.

I found the Editor useful when I needed to delete some coded garbage which had been received while transferring an ASCII file from my Commodore 128 to my Amiga. Anyone who downloads files knows that some services and software will append a block of padding to the end of the file which needs to be chopped off before the file or software can be used. Snipping that unwanted block of code is very simple with Program Editor. Beyond that specific use, the program is perfect for creating batch files (like the startup-sequence file).

Anyone who has used the Amiga's system editor (ED) will quickly abandon it for *Library's* program editor, since it has most of the editing functions and none of the limitations inflicted on the user by ED.

If you are a machine language programmer, you'll love the program's HEX edit feature. When it is activated two windows are opened—one which displays what is typed in ASCII code and the other using HEX. You are free to input code using either window—in fact you can toggle (by activating the window with the mouse) between the two windows. What is unique is that regardless of which window you use, the code is echoed in both windows (if nothing else, this is a simple way to learn the HEX equivalents of ASCII symbols).

Calculator

This utility contains three calculators designed to perform simple or advanced mathematical functions. The program performs flawlessly inside the Amiga's multitasking environment, so you can toggle between it and any other productivity program with a click of your mouse. In addition to supporting common math functions using the standard calculator, you can turn this one into a (1) scientific tool complete with trigonometric and logarithmic functions or (2) a programmer's calculator which supports hexadecimal, octal, decimal or binary mode, or (3) a financial aide capable of calculating interest, costs, profit margins and amortization. Each mode of operation gives you access to 100 memory registers which are maintained even when the program is closed. Before you finish with the program you can even save its current state, including registers, contents, display mode, window position and calculation to disk for future adjustments. Needless to say, *Library's* Calculator is not a plain vanilla math machine. If you have a need which involves math, you can do it with this utility. The program lacks one feature—you cannot dump your calculations directly to a printer.

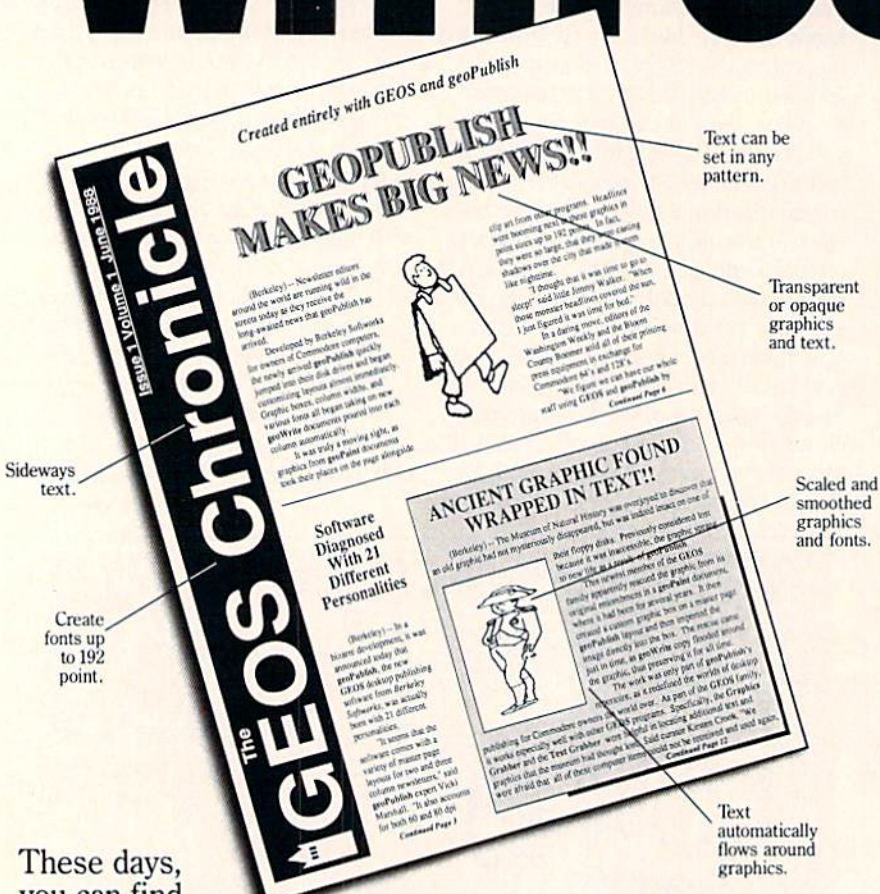
Complaints

As always, I can find something negative to say about any program, and *Library* is no exception. If you are a user of *WordPerfect* you will be annoyed by the inconsistent use of the numeric keypad. While the word processor uses the numeric pad primarily for cursor and editing controls (you have to shift to get the numeric response), some of *Library's* utilities ignore it completely or use it with inconsistency. Apparently, the numeric keypad is reserved for the exclusive use of the calculator.

Let me voice one more complaint about the handling of the numeric keypad by *Library's* utilities. If you are a heavy user of *WordPerfect,* you will soon stumble across another reason to be upset with the programmer's inconsistent handling of the keypad. One of *Library's* programs (I'm

Continued on page 110

WE SCOOPE WITH OUR FE



These days, you can find all kinds of programs that call themselves desktop publishers. Oh, one may drop a drawing here or create a column there. But don't let anyone kid you.

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—MicroTimes, March, 1988

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—RUN, March 1988

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Of course, those aren't the only reasons we're excited about geoPublish. It's also because major magazines—like the tough guys at INFO

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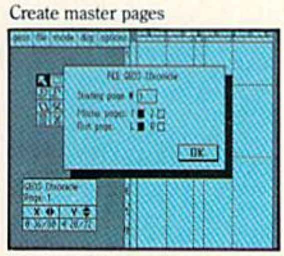
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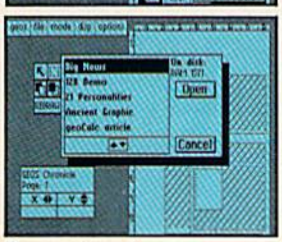


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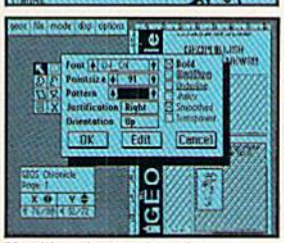


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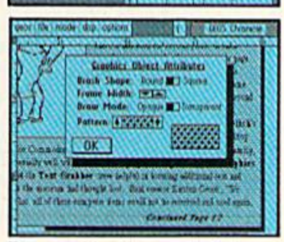




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Reviewed by John J. Kottler

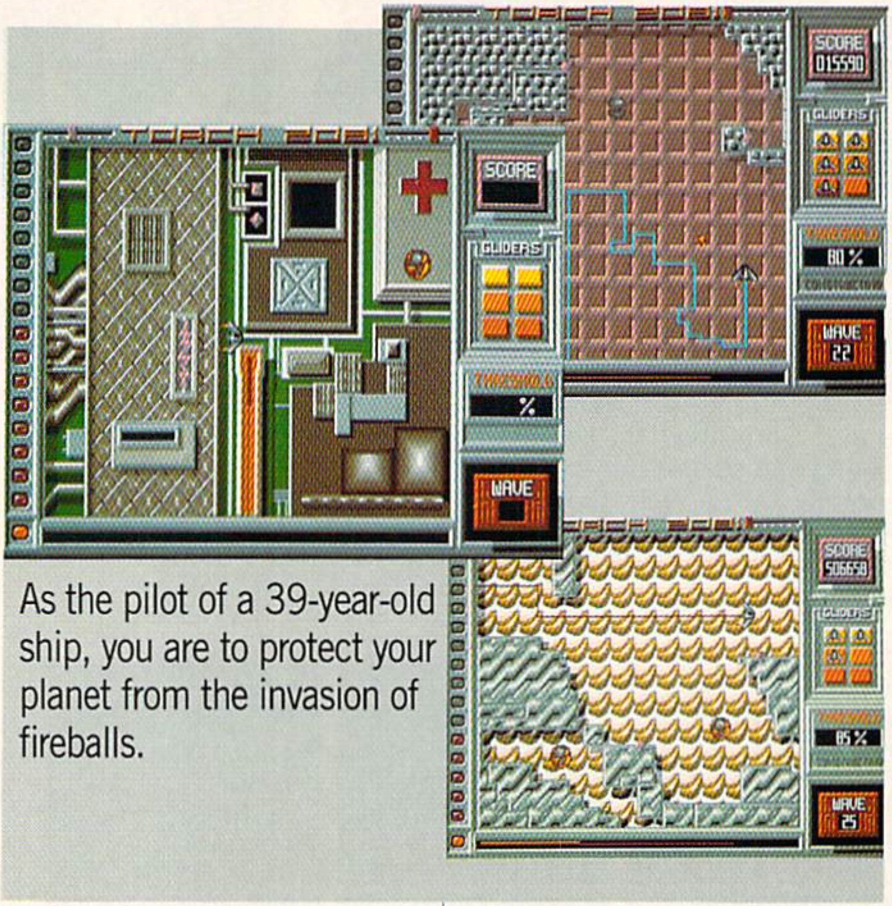
Torch 2081

Computer: Amiga
Publisher: Digital Concepts
43035 Hayes Rd.
Suite 229
Sterling Heights, MI 48078
Price: $29.95

A thunderous clap bursts as another fireball scorches across the sky. Your eyes follow the ball's path, and you wince upon its impact. The burst of light is unbearable, yet you manage to fumble for the doors to the rusty hangar. You punch the button and they creak open, slowly revealing an archaic Star Defense Glider. Maintenance crews shuffle between computer consoles and the glider, making last-minute adjustments. As you approach the glider, a private salutes, "She's all ready, sir."

Your eyes trace the outline of the ship, but are caught on the mechanism installed on the rear of the craft. A sigh of despair escapes you as you wonder how this space glider can possibly halt the invasion of fireballs that plagues your planet. You climb into the craft's cockpit, familiarizing yourself with its ancient instruments. Another burst of light sparks outside the hangar and you realize you have no time to waste. Several lights blink on at the touch of a button, and you wrap your hands around the craft's controls. Anxiety builds as you glance back toward the new addition to your glider. All you can do is hope and pray that this contraption will work. Reseating yourself, you shove the throttle forward, regaining confidence once the glider's engines roar at your command.

Torch 2081 is an arcade game that combines arcade action and strategy. As the pilot of a 39-year-old ship, you are to protect your planet from the invasion of fireballs. This Star Defense Glider (SDG) has been outfitted with a device that allows you to construct metallic barriers which strengthen the planet's defense shield. The object is fairly simple: to shield a required percentage of the planet's territory. Although this task seems simple, it is not. The fireball that you are attempting to enclose bounces around the screen at random speeds in random directions. If it touches your ship or the trail that your ship leaves behind to construct a wall, your ship is destroyed. Besides the fireball an additional hazard, the spitfire, is occasionally thrown from the core of the fireball. This menace destroys your ship if it comes in contact with it. In addition there are perimeter patrollers that rove around the border of the playing field. They will also follow along the borders of the walls you have created and seek to destroy your glider. As if all this weren't enough, you must complete the level before your glider runs out of fuel.



As the pilot of a 39-year-old ship, you are to protect your planet from the invasion of fireballs.

Those who remember the game *Qix* from the arcades will find similarities in *Torch 2081*. The object in *Qix* was to enclose an unruly line within boxes created by your path. Although the gameplay is fairly similar, Digital Concepts has added a realistic story line behind it and altered it enough to make it an incredibly addicting game. The graphics are superbly animated, and the sounds are clearly digitized. Unfortunately, there is no real difference between levels of play. Successive levels offer no unique qualities besides colors and fill-patterns as far as the playing field is concerned. The only factors that change are speed and difficulty. If there were different playing boards for each level, the player would have a greater desire to continue playing harder to see the next level. Every five levels there is a bonus level which includes two fireballs instead of one.

In all, Digital Concepts has done a fine job of reviving a classic arcade hit. The game is one that is enjoyable to play and will certainly capture the player's attention for a good length of time. Its only drawback lies not in the game itself, but in its documentation. The instruction manual included with the game is brief—almost too brief. My copy of the manual neglected to inform me of "Bonus Squares" that pop up occasionally on the playing board. Several different squares appear with different labels. Unfortunately, this was not covered in the manual, and I still have no idea what some of the squares do. Some offer bonus points, while others actually destroy the ship!

Overall, *Torch 2081* proves to be a promising revival of a once-popular arcade game. It is important to remember it is not a simulator, but a strategic arcade game viewed from above the ship. The game will certainly be considered a unique one in the Amiga world and a favorite to old *Qix* fans.

Reviewed by Jay Kee

Global Commander

Computer: Amiga
Publisher: Datasoft
19808 Nordhoff Place
Chatsworth, CA 91311
Price: $39.95





The trick is to understand the true nature of the relationships between nations and head off trouble before it escalates into war.

The year is 2032. You've been appointed Global Commander of the United Nuclear Nations, and your mission—should you choose to accept it—is to ride shotgun over the 16 member nations and keep them from blowing each other up—a job that might best be described as juggling chain saws while going over Niagra Falls in a rubber dinghy. But don't get the wrong idea. Your chances for success aren't impossible at all . . . just highly unlikely.

This is *Global Commander,* the latest Amiga release from Datasoft, and one that is very likely to cause some serious hair loss among its players.

Your first hint of trouble is the letter from the former Global Commander printed on the inside front cover of the manual. It doesn't take a degree in Rocket Science to realize this guy's elevator doesn't go all the way to the top floor—obviously the result of too much time spent playing *Global Commander.*

The second sign of trouble comes when you realize that this is the same guy responsible for supplying the hints and tips on strategy "sprinkled throughout the manual."

The final clue comes when you try to play the game. In a matter of a few moves, all hell breaks loose. Accusations fly and demands for food, technology and nuclear weaponry start piling up. Cryptic radio traffic is intercepted, and some of the messages are even unscrambled enough to be read. Your orders to re-allocate food and resources are sometimes ignored; your orders to cut back on nuclear weapons are always ignored (unless your Rapid Deployment UNN Task Force happens to be stationed in that country, but your UNN Task Force is *always* two or three weeks away from the country where they're most needed). Unfriendly countries start criticizing your efficiency, demanding your resignation; friendly countries pat you on the back while stockpiling illegal weapons. Conventional wars start without warning, then nuclear war breaks out. A non-confidence vote is called, and 12 of 16 countries give you the thumbs-down—you're out on your butt.

Back to the manual, re-read it again for the third time—is there something you missed? Try again and yet again. The results are pretty much the same.

Balance of Power comes to mind when you first play this game. There are some obvious similarities. However, while not nearly as complex, *Global Commander* is infinitely more frustrating. The primary reason is a manual that is too busy being funny to be useful. It provides the barest outline of the game's various elements, offering virtually no practical or useful information.

However, the game itself is straightforward enough. As Global Commander, you control SDI and Reconnaissance satellites—one to intercept incoming missiles and the other to gather intelligence information—and a UNN Task Force. You position the satellites over nations that are either hostile or suspicious, repositioning them as the political climate changes. You also deploy the Task Force to nations that are behaving particularly badly in order to bring them into line (your only "military" option).

You monitor the Resource, Technological and Nuclear capabilities of each country through simple bar graph displays, and monitor communications with a radio receiver that scans across six frequency bands. It's up to you to learn which frequency each country is using, and unless you're tuned to that exact frequency, the messages you intercept are scrambled. Unscrambling a message requires turning eight signal filters on or off in correct combination.

Interaction with the 16 member nations is accomplished through sending or receiving "memos" and official letters. In this manner, nations can ask for food, resources or weapons; request sanctions; state intentions, criticize or praise your actions or declare war. Concurrently, you (as Global Commander) can order an increase or decrease in missiles, issue letters of reprimand or support, allocate food or technology, tell nations to improve their relations or call a vote of confidence (not a particularly good idea in most cases).

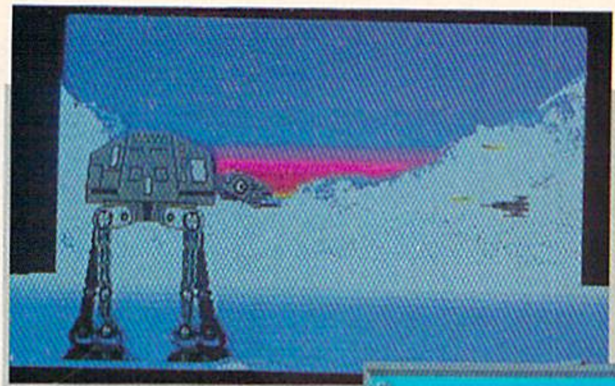
The trick to this game is understanding the true nature of the relationships between nations and heading off trouble before it escalates into war. The only problem is that the manual does not provide enough background information to enable a player to adequately interpret the words or actions of member nations.

The net result is a game that has to be played blind, with player actions based on pure guesswork and strategy devised by trial and error. A frustrating and totally unnecessary flaw in what is otherwise a very well-designed game.

Reviewed by Jeffery Scott Hall

Ganymed/ Bomb Busters

Computer: Amiga
Publisher: ReadySoft, Inc.
P.O. Box 1222
Lewiston, NY 14092
Price: $29.95 each





It is your job to assume command of the star fighter jet and blast as many robots as possible.

Two new arcade games from ReadySoft are for pure arcade addicts wishing to indulge in some fast-paced shoot-outs and quick-thinking strategy. Both games come under the company's Euroline title, which means great games for a lower price.

Ganymed

This is a fast-reflex, laser-blasting game based on the robotic snow walkers from the movie *Star Wars*. Press the fire button to start out with four ships. It is your job to assume command of the star fighter jet and blast as many robots as possible. At the top of the screen are three indicators: current level, score and the number of lives remaining. Your ship will always appear on the far right side of the screen, and the enemy robots will be hidden somewhere on the left side. As you move your ship left or right, the background will scroll horizontally in that direction.

Each level consists of four large stationary robots which fire homing lasers at your ship. This makes it extremely difficult to destroy them, requiring you to make several passes while firing directly at them. After several direct hits from your lasers, the robot will come crashing to the ground, so you can go on to the next one. Once all the robots have been destroyed, you will advance to the next level, which will be tougher than the last. You will be rewarded with an extra ship for every thousand points.

I have one major complaint with *Ganymed*—the scenery doesn't change throughout the entire game. It would've been nice to see a different background now and then, as well as some different looking robots.

In spite of this, I found *Ganymed* both challenging and enjoyable. The game includes a handy pause option for taking time out from blasting the enemy and a top ten list of the greatest sky fighters. *Ganymed* combines great sound effects and graphics in an enjoyable game for anyone looking for fast-paced laser action.

Robot Removal: *Ganymed* Tips

- When attacking a robot, fire heavily at the head. Make passes instead of direct attacks. This is done by firing and running until the robot is finally destroyed.
- After you've destroyed a robot, part of the body section might still be visible. Do not attempt to pass this; if you do, it will most likely result in the ship's destruction. Wait to fly past when the body section is no longer visible.

Bomb Busters

Quick thinking and fast action are required to be a bomb buster. The game begins with rap music and voices in the background. Press the fire button and enter a level code or press RETURN for none. After every tenth level in the game, you will be given a code word which may be entered at this prompt. This allows more advanced players to skip past the less demanding levels of play.

As a member of the Bomb Busters, you must collect all the bombs before they explode. Equipped only with a jet pack and four Bomb Busters (or lives), you must journey to different regions of the globe in order to stop the terrorists from destroying famous landmarks. You appear in randomly-determined places ranging from the Statue of Liberty in the U.S. to the pyramids of Egypt.

Bombs will be placed in different strategic locations around the landmark; the number of bombs varies according to which level you are in. It is your job to deactivate the bombs—by touching them—before they explode. This is done by moving our bold character in the direction of the bomb with his jet pack. (Pressing the fire button and joystick in the direction you wish to go activates the jet pack, allowing you to fly around the screen.) This would seem boring if no enemies were included to stop you. So in order not to disappoint you, at least one enemy will be in each level. These enemies float in different areas on the screen and range from a .357 Magnum to a broom that just sweeps you away. If any contact is made, you will lose a life. While you are playing the game, a laughing happy face will appear for a short time. If you successfully touch the happy face, you will be rewarded with bonus points, an extra life or a power pill which lets you destroy the enemy. When a bomb starts to flash, you have only a few seconds to reach it before detonation. If you are unsuccessful, you will either be killed or the landmark will be defaced.

After a successful bomb bust, the game screen will be replaced with the bomb bonus screen. This transition is uniquely done through the use of screen wipes—truly a nice added special effect that must be seen to be appreciated. The bomb bo-

Continued on page 105

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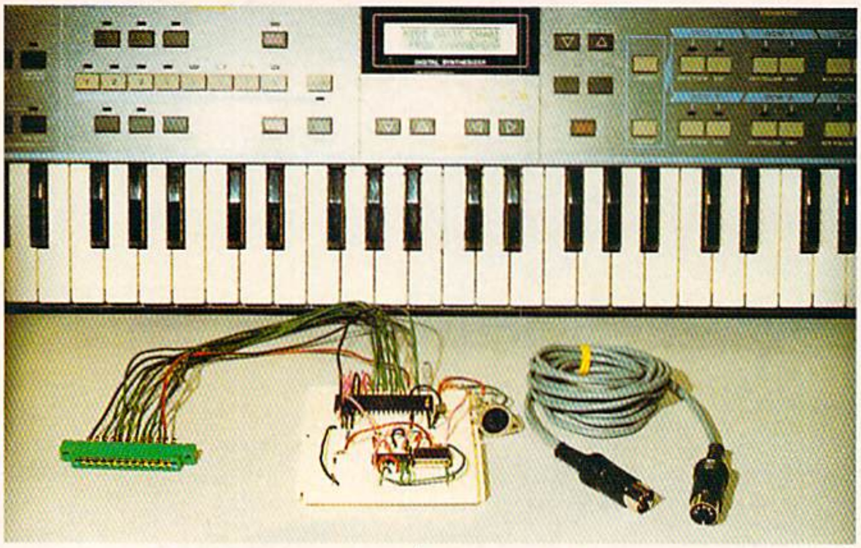
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by John Iovine

Building a MIDI Interface Device

for the Commodore 64 and 128



MIDI is an acronym for Musical Instrument Digital Interface. MIDI is a standard communication protocol (fast serial) that allows various electronic music synthesizers to be linked to one another. An electronic marriage of computer technology to music synthesizers is possible due to the implementation of MIDI. This month's project will provide that interface.

Why Electronic Synthesizers?

Electronic synthesizers in general have opened up a whole new world of possibilities for musicians and artists. Aside from the synthesizer's ability to accurately mimic traditional instruments and sounds, they have an added ability to generate new colors of sound never seen before. The possibilities do not end there.

Inasmuch as synthesizers are a tremendous boon for musicians, with MIDI they are even better. The most obvious advantage is the ability to play or control several synthesizers at once from a single MIDI-compatible instrument (See figure 1). Each synthesizer in the system can be programmed to play a different instrument, that plays a single track of a multi-track musical composition. Various musical parameters such as tempo, volume, pitch, patches can also be controlled and changed via MIDI.

Today a composer can hear musical compositions he has written without the need for other musicians hanging around waiting to play a piece or wasting costly studio time.

History

As early as the 1920's we have had electronic music synthesizers. The first synthesizer was the Thermin. The Thermin was used in early productions of science fiction movies, due to the eerie sound effects it is capable of producing.

In the '60's and '70's the electronic music boom began. It started as a trickle of add ons to standard instruments, such as fuzz boxes, reverbs and sustain units used on guitars.

Oscillators generating tone frequencies were used as simple piano organs. These basic synthesizers evolved into the Moog and ARP monophonic synthesizers. (Our computers have a decent sound synthesizer, the SID chip, that you can use to create your own sounds à la ADSR envelope.)

The next development was polyphonic synthesizers that had the capability of generating more than a single note at once. At this plateau a number of companies—Yamaha, Sequential Circuits, Roland, APR and others—began manufacturing synthesizers.

The next major advance in synthesizers added programmable memories. This allowed musicians to easily create programmed sounds (patches) and store them in memory. Previous to this, keyboards had to be painstakingly hand wired with patch cords to create a particular sound. The patchcord setup resembled old-fashioned telephone switchboards on top of the keyboard. This is why in the early days of synthesizers people like Keith Emerson (of Emerson, Lake and Palmer) had extravagant keyboard arrangements on stage. But with the new programmable memories, musicians had the flexibility to recall previously-programmed sound patches even during live performances.

At this point companies also began adding interfacing devices to their synthesizers so that musicians could layer synthesizers together to create music.

Other companies began making sequencers. Sequencers are devices that can record a performance and play it back.

A problem arose at this point: connecting sequencers and synthesizers from different manufacturers didn't work. Each manufacturer had created its own protocol that worked only with systems it created.

Enter MIDI

In 1981 a meeting of the electronic synthesizer manufacturers was held, at the semi-annual National Association of Music Merchants (NAMM). The meeting was called to discuss the standardization for the transmitting and receiving of musical information. The original proposal was called UMI, for Universal Musical Interface. Many of the companies involved had already developed their own protocol. Because of this there were a lot of delays, compromises and revisions before generating a standard protocol, later to become known as "MIDI: Musical Instrument Digital Interface." (It appears that the word *universal* in the original proposal may have invoked anti-trust suits against the manufacturers, so the name was dropped.)

Finally in 1983 the first MIDI standard keyboards came off the line. Fortunately, the developers of MIDI were farsighted enough to leave room in the new standard for subsequent improvements in technology and methodology. Today MIDI is still evolving and improving without destroying the basic communications compatibility for which it was created.

Anatomy of the MIDI Signal

The first thing we notice about a MIDI signal is that it appears to be a standard serial signal. A serial signal as we know needs only two conductor lines to communicate. The second observation is on the 31,250 Baud +/–1% (bits per second) rate used by MIDI. Compare this to your standard 300 or 1200 baud modem, and you

have an idea or how quickly you can transmit bytes.

Let's examine the serial signal. Looking at figure 2 we can see that the signal transmits bits (binary ones and zeroes) like a standard serial line. But upon closer examination there is a very significant difference.

Computers use standard TTL logic signals. A +5 volt represents a binary "1" and 0 volts represent binary "0". With MIDI, however, we do not use voltage to determine the binary state of the line, we use current. In addition, the signaling is the exact opposite. In other words, "current off" equals a binary "1", and "current on" equals a binary "0".

Anatomy of the MIDI Bytes

Eight bits to a byte, well that hasn't changed. MIDI uses two types of bytes—Status byte and Data byte. As we know (or as we should) a byte can contain any single numeric value between 0 and 255. MIDI however breaks up the byte into small groups of bits, then assigns a particular function to the bit groups. To clear this up before it becomes confusing, let's analyze the first byte in a MIDI message called the Status byte (See figure 3).

The Status byte is broken into three groups. Each of these groups are to be looked at as a single number. The first group consists of a single bit, bit number 7. Group 1 has two possible values—1 or 0. The second group consists of three bits, bits numbers 6, 5 and 4. Group 2 has eight possible values (0 through 7). The third group comprises the four remaining bits numbers 3, 2, 1 and 0. Group 3 has 16 possible values (0 through 15).

This is how MIDI interprets the data:

Byte #1 Status Byte

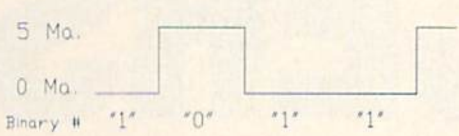
Bit #	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]
Binary Value	1	0	0	1	0	0	1	0
	↑ Indicates Status Byte							

If the most significant bit (number 7) has a value of "1", MIDI determines that the byte is a status byte. When MIDI sees this binary "1" in bit number 7 position, it knows it is reading a status byte rather than a data byte.

The second group of bits—bits 6, 5 and 4—specifies the kind of message the status byte is transmitting, such as note on, note off, patch change, etc.

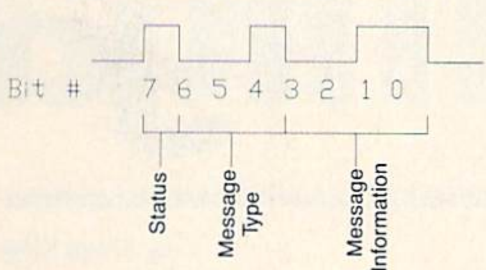
The third group of bits—bits 3, 2, 1 and 0—can represent different kinds of information, depending upon what the second

Figure 1. MIDI Serial Signal



Rise and fall time less than 2 microseconds

Figure 2. Anatomy of a MIDI Status Byte



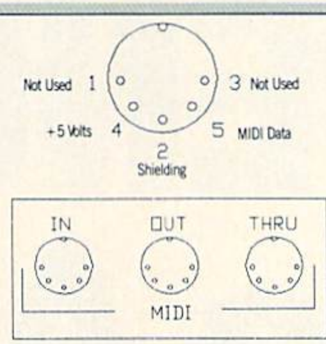


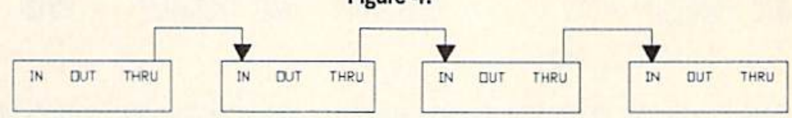
Figure 3.

MIDI Interface Program

```
15 POKE 56579,255:POKE 56577,0'CRTG
20 C=128+16:D=64:E=128:F=0
   :J=56577'GAWH
25 READ A,B'BDDE
30 IF A=-1 THEN RESTORE:GOTO 65'GFLD
35 POKE J,C:POKE J,A:POKE J,D'DLXI
40 FOR G=1 TO B:NEXT'EEBD
45 POKE J,E:POKE J,A:POKE J,F'DLCJ
50 GOTO 25'BCOB
55 PRINT"ERROR"'BAOI
60 DATA 42,175,46,175,48,175,50,175,
   52,175,54,175,-1,-1'BWDL
65 GET K$:IF K$=""THEN 65'EHIL
70 PRINT 1:GOTO 20'CENE

--<< END >>--
```

Figure 4.



Daisy Chained MIDI Compatible Instruments

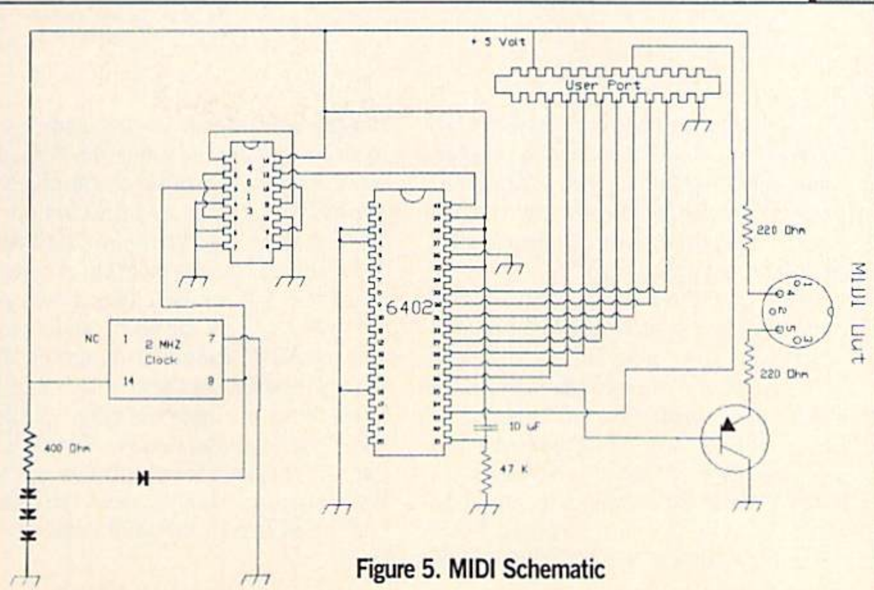
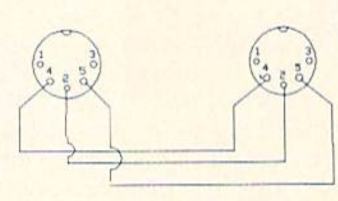


Figure 5. MIDI Schematic

Figure 6. MIDI Cable



Use 5 Pin DIN Plugs

Use 2 Cond Shielded wire (see parts list)

Cable length less than 25 feet

Continued on page 94

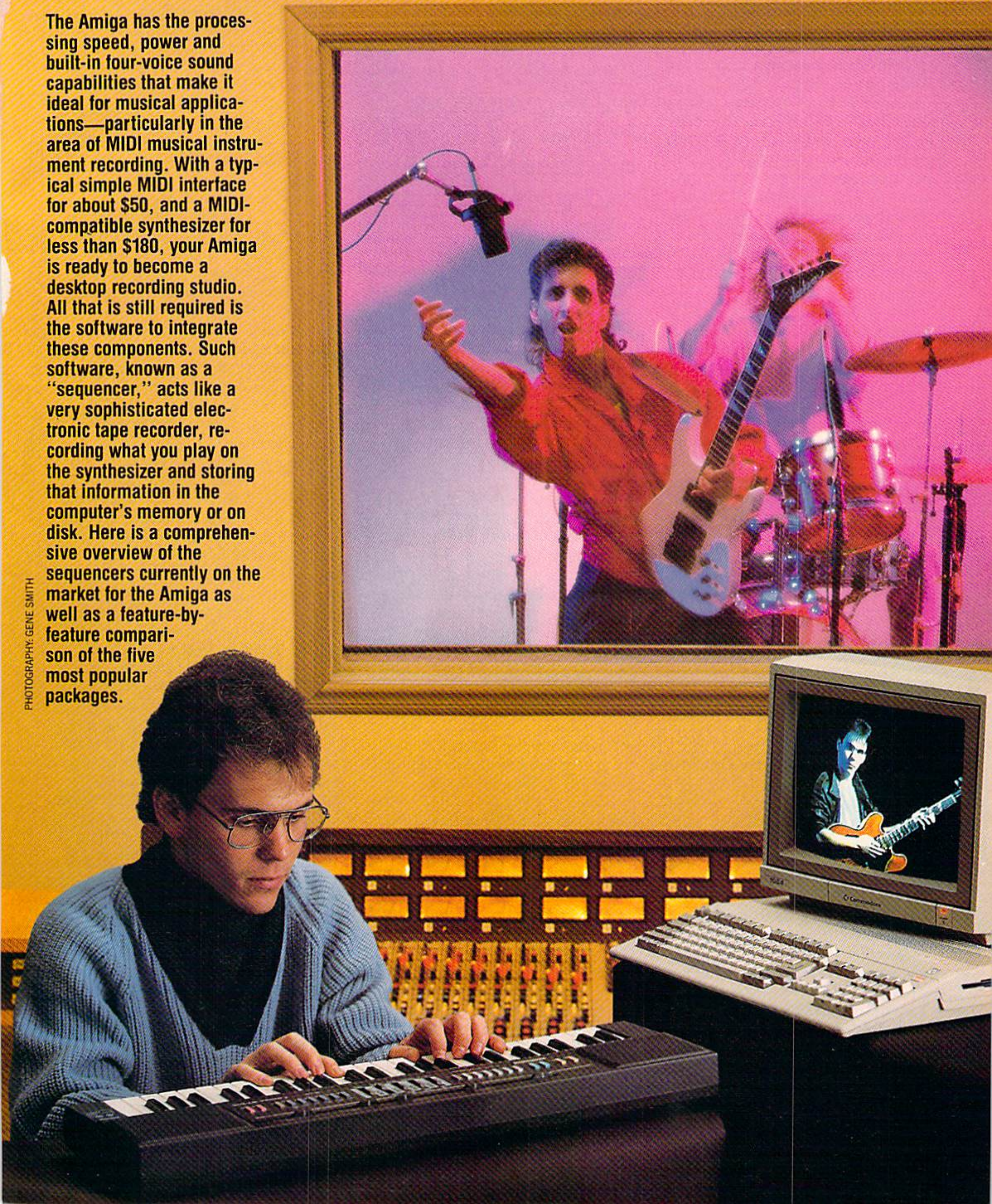
MIDI SEQUENCERS for the Amiga

by Steve King

The Amiga has turned out to be an incredibly versatile computer. Its processing speed, power and built-in four-voice sound capabilities make it ideal for musical applications—particularly in the area of musical instrument recording. However, this capability would not exist without the MIDI protocol. Simply speaking, MIDI (which is an acronym for Musical Instrument Digital Interface) is a special language which permits computers and MIDI-compatible musical instruments such as keyboards to communicate with each other through a simple hardware device plugged into the serial port of the Amiga. For the remainder of this article, I will refer to a musical keyboard as a "synthesizer" to avoid confusion between it and the computer keyboard. There are sixteen separate MIDI channels which for all practical purposes can transmit or receive data simultaneously.

When a synthesizer is connected to the computer, the computer is capable of detecting which notes are being played and their duration. More sophisticated synthesizers can transmit other information such as the pressure being applied to the keys, pitch wheel operation and after-touch. Conversely, a computer can send MIDI information to a synthesizer. In this mode, the computer can actually play the synthesizer and even change instruments, or voices, during the rendition. For example, a computer program can send a bass line staff of music to a synthesizer on MIDI channel 1 and a melody staff on MIDI channel 2. The program can also instruct the synthesizer to play a bass guitar voice on MIDI channel 1 and a piano voice on MIDI channel 2 (assuming that the synthesizer has these sounds and is multi-tibral, or capable of playing different sounds simultaneously). When the playback mode of the program is started, the synthesizer will play both the bass and the melody at the same time.

The Amiga has the processing speed, power and built-in four-voice sound capabilities that make it ideal for musical applications—particularly in the area of MIDI musical instrument recording. With a typical simple MIDI interface for about $50, and a MIDI-compatible synthesizer for less than $180, your Amiga is ready to become a desktop recording studio. All that is still required is the software to integrate these components. Such software, known as a "sequencer," acts like a very sophisticated electronic tape recorder, recording what you play on the synthesizer and storing that information in the computer's memory or on disk. Here is a comprehensive overview of the sequencers currently on the market for the Amiga as well as a feature-by-feature comparison of the five most popular packages.



PHOTOGRAPHY: GENE SMITH

Believe it or not, MIDI is not an expensive proposition. A typical simple MIDI interface costs about $50, and MIDI-compatible synthesizers can be purchased for less than $180. For this article I used the new Yamaha PSS-480 which can play 12 notes simultaneously. If controlled by the Amiga, any 12 of its 100 different voices can be played at any one time. I also used Datel Computer's MIDI interface which accepts as an input device one MIDI-compatible synthesizer but has outputs to control three separate devices. Other more expensive MIDI interfaces have pass-through connections, so you can connect other serial devices (such as modems and printers) to the interface and use them without constantly having to switch connectors.

With computer, synthesizer and MIDI interface in hand, all that is required is software to integrate them. Such software is known generically as a "sequencer." A sequencer is a very sophisticated electronic tape recorder which records what you play on the synthesizer and stores that information in the computer's memory or on disk. Unlike a normal tape recorder, however, once you have recorded a musical

A typical simple MIDI interface costs about $50, and MIDI-compatible synthesizers can be purchased for less than $180.



passage, you can go back and change individual notes because they are "recorded" as numbers and not sounds.

Moreover, you can record several different passages and then combine them in any order to produce an entire song. For example, if you were recording a three-minute song on a normal tape deck, you would have to play several identical verses and choruses for three minutes—and keep doing it over and over until you got it right! With a sequencer, you can record the verse and chorus just once, make corrections on the computer and finally combine the verse and chorus into a song merely by instructing the program to repeat the verse passage twice, then the chorus, then the verse again and finally the chorus. Needless to say, this process (record, edit and combine) not only saves time but also produces a flawless performance.

There are a number of sequencer programs on the market, ranging from the

The more tracks a sequencer has, the more parts and instrumentation you can record for each song.



very simple for the hobbyist to the highly complex, powerful and expensive for the professional musician or recording studio. I will first discuss the important features to look for in any sequencer and then review and compare the capabilities of the different sequencer programs to give you a better understanding and feel for which would be best for your particular application.

Recording on a Sequencer

There are basically two methods of recording on a sequencer. The first (and most common) is single-track recording. In this mode, you activate one of the sequencer's tracks, or channels, start it running and play your synthesizer. Everything you play is fed into the sequencer on a single MIDI channel which can then be played back. You then proceed to record additional music on other tracks which are all synchronized. The simplest example is recording a bass line on track one, chords on track two, a melody line on track three and instrument orchestration on track four. The more tracks a sequencer has, the more parts and instrumentation you can record for each song. Although there are only 16 MIDI channels, professional tape equipment can have more than 16 tracks and can utilize the additional sequencer tracks.

Single-track recording is not often useful with MIDI instruments which output on several MIDI channels simultaneously (the upper half of a keyboard on Channel 1 and the lower half on Channel 2). For this type of recording, you will need a sequencer which initially accepts input from more than one channel. This feature is particularly useful for the musician who wants to record auto-accompaniment patterns (bass, rhythm, chords and orchestration) available on many of the home synthesizers which output on up to six different channels simultaneously.

Another important feature in recording is the ability to shift the timing of each of the tracks. In this not-so-perfect world, the odds are that one or more of the tracks you are recording will not start at precisely the same time as the others and will end up out of sync. Rather than constantly re-recording to "get it right," a commonly-available feature lets you shift a track forward or backwards to line it up with the others.

"Punch In and Punch Out," simply speaking, is a method of recording over a previously-recorded segment of an existing track. If, for instance, you recorded an eight-measure melody line and made a mistake in the third measure, you can Punch In at the beginning of the third measure and Punch Out at the end of that measure, and the sequencer will replace the previously-recorded third measure with the new notes you play. To be useful, this feature must allow you to easily find the exact place in your score to Punch In and Punch Out.

MIDI filtering is also a valuable tool—especially if you have limited memory. You will recall that MIDI data is not simply notes, but also information about key pressure, aftertouch and pitch wheel operation. These latter events consume tremendous amounts of memory which decrease the amount of space left for your song. If you don't need this information, it is best to filter it out in real time while you are recording. Most sequencers have an option that lets you specify which MIDI data you do or don't want to capture, although some eliminate the unwanted data as a post-recording editing function.

Another necessity is a Lead-in function which simply provides a four-beat metronome click prior to actually recording.

Step-time recording is useful for complicated patterns where you can't play the synthesizer fast enough to achieve your desired effect.



Without this, it becomes extremely difficult to know when to start accompanying the previously-recorded track if subsequent tracks are to start at the beginning

of the sequence. Some sequencers also provide a continuous metronome beat throughout your recording session.

Finally, some of the sequencers support step-time recording. This mode lets you step through a measure note by note, usually by pressing keys on the computer keyboard. At each specified timing point you can insert a note. This is useful for complicated patterns where you may not be able to play the synthesizer fast enough to achieve your desired effect.

The data that the sequencer displays is not in graphic notation form on a staff, but in a row of letters and numbers.



Editing What You Have Recorded

Once you have recorded all of the parts of your song (including multiple tracks of the same part so you can select the best), you will probably want to edit the sections before you actually combine them into a completed song. The sequencer should have a feature which lets you examine and change each of the MIDI events that comes into the computer, so that you can change both the pitch and duration of an individual note. It should also let you insert Program Change events which, for example, tell the synthesizer to start playing the notes with a different instrument voice.

Unfortunately, the data that the sequencer displays is not in graphic notation form on a staff, but in a row of letters and numbers for each occurrence. The following line is typical of a MIDI event display:

1:00.00		6		Pgm
1:01.00	C	5	64	Ntn
1:01.11	C	5	0	Ntf

Translated, the above notation means that at the beginning of the very first beat, a Program Change event was sent to the synthesizer telling it to play the notes that follow with preset voice number six. The next two entries indicate that the note "C" in the fifth octave was pressed at the beginning of the first measure with a velocity of 64 and released on the eleventh clock subbeat of the same measure. Since there are normally 24 MIDI subbeats per quarter note (ranging from 0 to 23), half of a quarter note (or an eighth note) was played. The first event was manually entered in the edit section of the sequencer while the latter two events represent musical data from the synthesizer.

Needless to say, the inability of sequencers to display notes in standard musical notation makes editing extremely difficult and time consuming, and each program has its own method of displaying MIDI data events. To edit the MIDI data, you must first find the specific event and then manually edit the line to make the appropriate change. And in most cases, if you add a new note, at some point you will have to insert an appropriate event to turn that note off. Also, all sequencers should have commands to copy, delete and move blocks of MIDI data.

Another extremely important feature is Quantization, or Auto-Correction. As the resolution of sequencers is so great, the sequencer will actually record the note to the nearest 1/192nd of a beat (and sometimes smaller). Thus, what you may think is a quarter note may actually be picked up as a 49/192nd note. Close, but no cigar. While the difference is audibly meaningless, try using a program that takes your song and prints it as sheet music. Have you ever seen a graphic notation for a 49/192nd note? There is, however, a simple way to solve the problem. After you have recorded your tracks, simply tell the sequencer to go back over all the notes and round them off to some sensible value (such a sixteenth or eighth note). In fact, some sequencers will even do the auto-correction as you are playing in real time. In some of the sequencers, while the note will still remain a 49/192nd note, the beginning of the note will be moved to a rounded note value position.

Quantization, or Auto-Correction allows you to tell the sequencer to go back over all the notes and round them off to some sensible value.



Another useful feature to have is Track Merge. This feature will take all the notes on several user-specified tracks and combine them into one track. For example, you can play the same eight-measure musical passage three times—once on track one, then on track two and finally on track three. In the edit mode, delete those portions of each track which are not to your liking (making sure that you have left at least one segment for each portion). What remains is the best of each take spread over three different tracks. Now by merging the three tracks, you'll end up with one track representing the best of them all.

Other tools usually available on all sequencers allow you to transpose the pitch of any pattern, track or portion of one as well as set the tempo of tracks or even specified parts of them.

All of the sequencers will play through external devices such as synthesizers, but only a few will use the internal Amiga voices.



Putting It All Together

Once you are satisfied with all your little sequences, you must combine them in some logical fashion to come up with your final creation—a hit song, of course. Obviously, all sequencers will accomplish this vital task, but some do it more easily than others. Since each pattern or sequence of your song will probably contain several parallel tracks (for bass, rhythm, chords, melody, etc.), the important point is the ease in combining all of the segments at one time. Some sequencers will link specified tracks to one sequence (which makes creating your song simple) while others may require you to link your melody sequences, then the bass, then the chords and so forth. This is called doing it the hard way.

When your song has been patched together, it's time to hear it. All of the sequencers will play the notes through external devices such as drum machines and synthesizers, but only a few will use the internal Amiga voices and digitized instrument sounds. This feature is great for

Continued on page 96

In the last three years, my growing computer systems have not only paid for themselves but have also pumped extra funds into the budget. Perhaps the only difference between us is I play with computers and get paid for it, while you may still be paying to play. With that in mind, I've collected some money-making ideas you might want to try with your computer. I'm sure one or more could be adapted to match your particular situation, experience and time constraints. With a little planning and work you can convert your hobby computer into a money maker instead of a bank account buster.

MAKING IT PAY

by Gary V. Fields

A single financial rule governs all my hardware and software purchases: each item can only be bought with money generated by my computers. As you might guess, this rule was not my idea. It was conceived, enacted and religiously enforced by my wife. She first became alarmed when she noticed more of the household budget was going into software and hardware purchases than mortgage payments.

But it was the death of our 15-year-old washing machine which sparked the passage of her fiscal responsibility doctrine. When the unfaithful old thing popped its last gasket my wife discovered our "emergency" money had evaporated about the same time I purchased my third 1541 drive. She was not happy with me. At the time, I thought she was being a bit narrow minded (not to mention autocratic)—after all, which is more important, laundry or another disk drive? But looking back, I must admit a roof over our head and clean underwear is probably more important than things like dual drives and 80-column displays.

When the demise of our washing machine brought our financial problems to a head, I had but two options: (1) I could either restrict my computer-related purchases or (2) find a way to make my computers pay for themselves. Thankfully, I've been able to do the latter.

Today, the payback potential of every major purchase (for us that means any-



thing over $30!) is considered before the item is bought. And in the last three years, my growing computer systems have not only paid for themselves but have pumped extra funds into the budget. Now all of our leisure expenditures (everything from vacations to the beach, to dinners for two) are financed with "computer money." I suspect most of us are much alike—we enjoy computers, love to try new or different software programs and get a thrill watching a photon-charged screen being updated. Perhaps the only difference between us is I play with computers and get paid for it, while you may still be paying to play.

With that in mind, I've collected some money-making ideas you might want to try with your computer. I'm sure one or more could be adapted to match your particular situation, experience and time constraints. With a little planning and work you can convert your hobby computer into a money maker instead of a bank account buster.

First you have to evaluate your situation. What are your interests, and how much time are you willing to contribute to making money with your computer? Few people are going to pay you to play games (unless you are beta testing software), but if you can use your computer to make their life easier, save them money or time, or help them deliver their products, they will welcome you with open arms and wallets. Unlike traditional tools, computers can be used for thousands of different jobs, providing you have the know-how and software required. Before you start you must identify your saleable skills and knowledge—are you more fluent in a computer language, databases, word processing or are you a pixel artist? And remember, just owning and feeling comfortable around computers may open some doors for you.

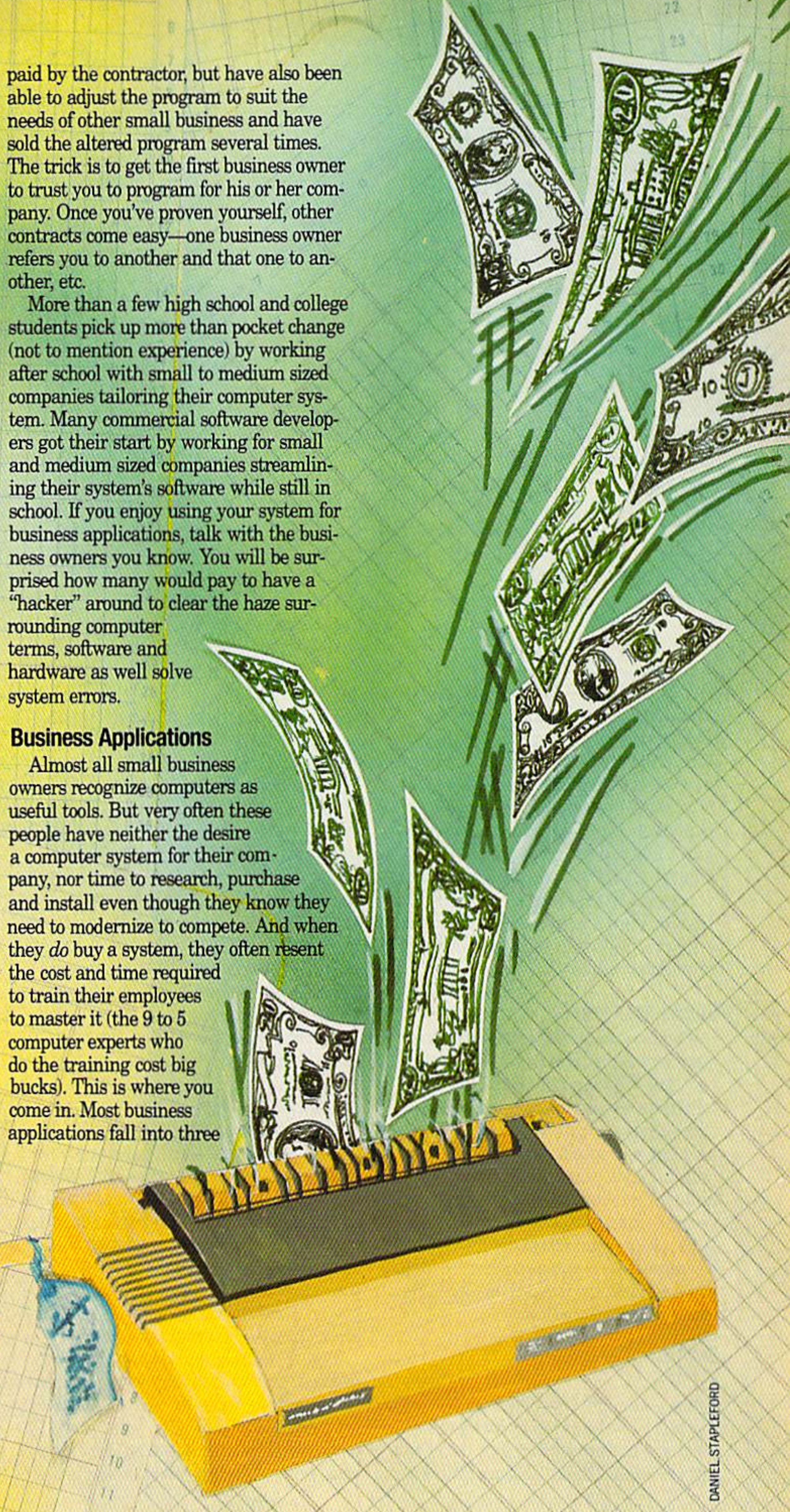
Programming

Being able to program your computer is not a prerequisite to using it for profit, but if you are fluent in any computer language your options are multiplied. I am far from qualifying as a professional programmer, but small business owners approach me periodically to write specific applications software for them. The first job I did was for a general contractor who wanted a simple database designed specifically for his company's payroll, inventory and tax requirements. For such applications, straight BASIC programs are sufficient. Writing and debugging the program took four weeks of my spare time. I not only got paid by the contractor, but have also been able to adjust the program to suit the needs of other small business and have sold the altered program several times. The trick is to get the first business owner to trust you to program for his or her company. Once you've proven yourself, other contracts come easy—one business owner refers you to another and that one to another, etc.

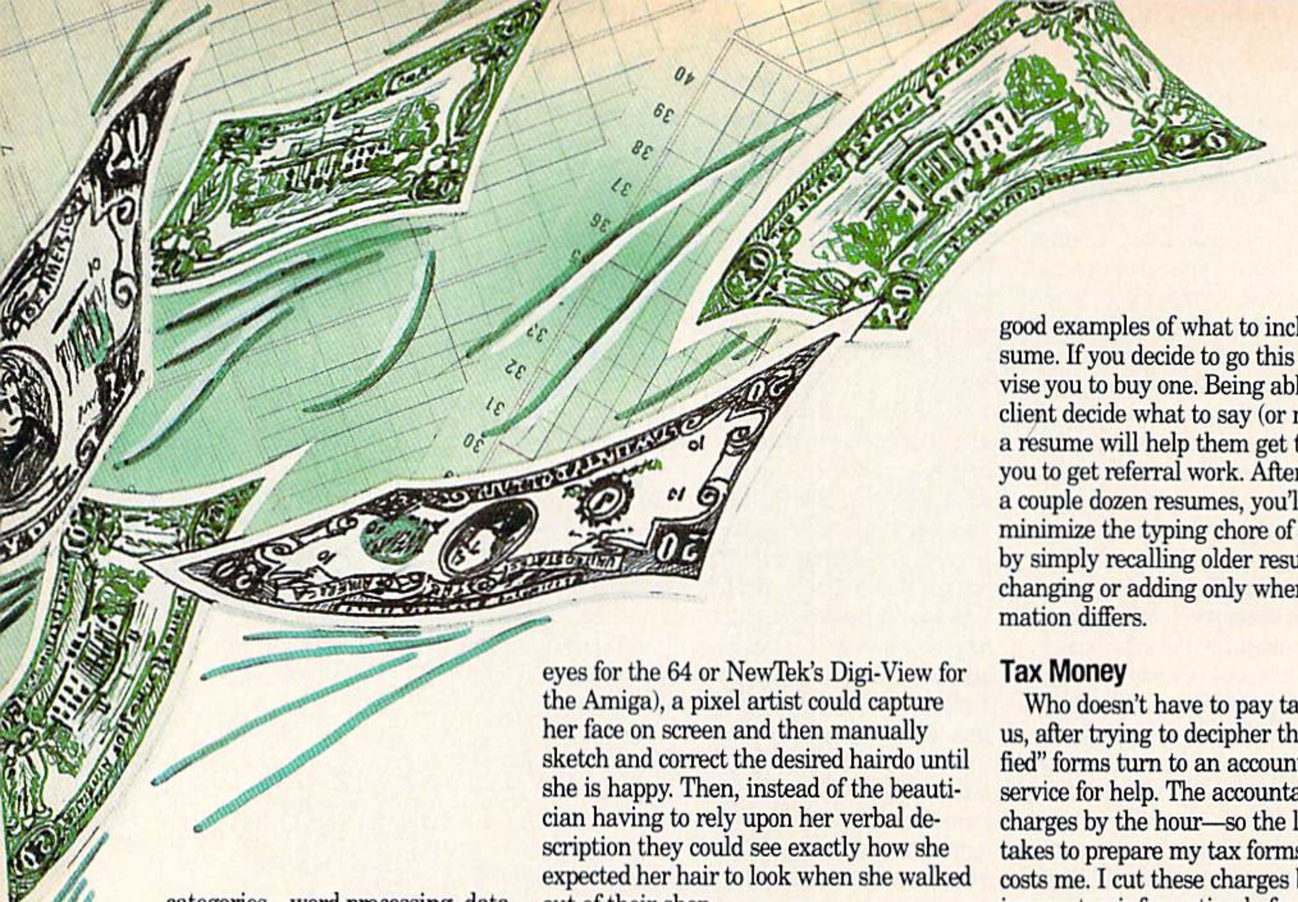
More than a few high school and college students pick up more than pocket change (not to mention experience) by working after school with small to medium sized companies tailoring their computer system. Many commercial software developers got their start by working for small and medium sized companies streamlining their system's software while still in school. If you enjoy using your system for business applications, talk with the business owners you know. You will be surprised how many would pay to have a "hacker" around to clear the haze surrounding computer terms, software and hardware as well solve system errors.

Business Applications

Almost all small business owners recognize computers as useful tools. But very often these people have neither the desire a computer system for their company, nor time to research, purchase and install even though they know they need to modernize to compete. And when they *do* buy a system, they often resent the cost and time required to train their employees to master it (the 9 to 5 computer experts who do the training cost big bucks). This is where you come in. Most business applications fall into three



DANIEL STAPLEFORD



categories—word processing, data base management and spreadsheet applications. If you are comfortable with any of these type programs, you have a marketable skill. Many small business owners will be willing to hire you to train their personnel in your spare time (providing you charge less than those 9 to 5 guys). Or if the company is very small you might be able to manage their database, or word processing chores yourself—either in their office or in your own home at night or weekends.

Stocks and Bonds

If you know anything about the stock market, you probably know people who invest there. Because there are specialty software and information services (like CompuServe) available to help investors keep track of specific stocks, bonds and mutual funds, you and your computer could collect vital information for those investors. Chances are there are a dozen or so people on your side of town who would be willing to pay you a retainer fee (or pay you commissions) for keeping daily track of the stocks they follow.

Digitizing for Dollars

If you are artistic, here are two ideas which you might try. When my wife gets her hair styled it never quite matches what she had envisioned. But using a digitizer (either Digital Vision's Computereyes for the 64 or NewTek's Digi-View for the Amiga), a pixel artist could capture her face on screen and then manually sketch and correct the desired hairdo until she is happy. Then, instead of the beautician having to rely upon her verbal description they could see exactly how she expected her hair to look when she walked out of their shop.

The same hardware and software could be used by home owners or contractors deciding what changes to make when either building or remodeling a house. A digitized image of a kitchen could be recreated to show exactly how the changes would look. Or if you are building a new home, an architect's sketches could be overlayed on a digitized photo of the property you intended to build, so you would know exactly what to expect when the last shingle is hammered into place. I'm sure you can think of other applications for digitized images for which people would be willing to pay, but these are the first two that came to mind.

Word Processing

I suspect more money has been made using a word processor than on any other software. If you go to any college's student hall you will see a bulletin board with notices offering to type term papers, reports, etc. for a fee. If you are a decent typist and own a good quality printer, this could be your meal ticket. Just leave your own notice on these boards, do the work and collect a check—what could be easier?

Typing resumes and cover letters for people trying to change jobs can help your system pay for itself too. All you need to get started is a short ad in your local newspaper's classified section. Any good book store or library carries books giving good examples of what to include in a resume. If you decide to go this route, I'd advise you to buy one. Being able to help the client decide what to say (or not to say) in a resume will help them get the job and you to get referral work. After you've done a couple dozen resumes, you'll be able to minimize the typing chore of new clients by simply recalling older resumes and changing or adding only where vital information differs.

Tax Money

Who doesn't have to pay taxes? Most of us, after trying to decipher the "simplified" forms turn to an accountant or tax service for help. The accountant I use charges by the hour—so the longer it takes to prepare my tax forms, the more it costs me. I cut these charges by organizing my tax information before I take it to her. I suspect most people would gladly pay someone else to help them cut this cost.

With your computer and a simple data base (or my "Tax Records 128" program which appeared in the March 1988 issue of *Commodore Magazine*) you can not only cut your own tax preparation cost but also make some money cutting the cost for others. It would be seasonable work, but as sure as April follows March, the work would be there year after year,

If you are familiar with the tax laws, you might even want to prepare tax returns for others, rather than just organize their paper work. There are good tax preparation software packages for each of the Commodore systems. The one I am most familiar with is call *Swiftax* and is marketed by Timeworks. Like all the other programs it is updated each year to reflect the newest tax laws.

Teaching

You might be surprised how much computer knowledge you have which others would be willing to pay to learn. You could run a small "piano-teaching"-type business in your own home. First, run a classified ad in the local newspaper or sale shopper (in the latter, personal ads are usually free) stating that you are offering computer literacy classes in your home and list your phone number for reserva-

tions. Then schedule classes when they are most convenient for you. But be prepared to teach—not play games. Most of your clients will be interested in learning to program or how to master their productivity software.

Publishing and Visuals

Because Commodore computers excel in graphic abilities, they are perfect for creating visual aides, graphs or slides for business presentations. Lots of companies need graphics created for annual reports, sales seminars, promotions, in-house newsletters, etc. Again, the bigger companies will have in-house departments to create these, but the smaller businesses have neither the staff nor the time to do these, although they might like to. Take an example of the type of visuals (slides, printed, videos) you could supply them and make them an offer. Again, once you have your foot inside the door, this type of service has the potential to grow into a healthy part-time business with little expense on your part.

Because the software market has released quality video titler programs for both the 64 and Amiga, creating custom video titles or training videos would be a natural money-making avenue to explore. But before jumping in, you either need to know something about video development or be willing to spend some time learning. But with the rising number of personal camcorders, I'm sure there are people willing to spend some cash having someone produce professional title screens and credits to give their creations a Hollywood look. Don't exclude businesses from your video creations either. As businesses modernize, they also develop a hunger for flashy, eye-catching business and annual reports. Using your computer and both video titlers or powerful graphic packages you can create that glitter for them.

Realtors

If you are a realtor, you might consider the advantages of using a digitized house listing compatible with a databases like *Superbase Professional* (Precision Software) or *Microfiche Filer* or *Microfiche Filer Plus* (Software Visions) on the Amiga. These programs allow the user to store and view digitized photos. Using them you could quickly search and recall properties which meet the requirements of your client almost instantly. For instance, if your client were looking for a house costing less than $95,000, with two bedrooms, family room and double garage on the east side of town, all you'd have to do is define a sort according to that criteria. When a match was found, your client could view digitized photos of the interior and exterior of the house without stepping away from your computer screen. Then rather than run all around town looking for just the right home, you and your client could concentrate on the homes which fit their requirements.

If you are not a realtor, chances are you could still sell this idea to one and earn extra money maintaining the database and photo files for them. Rather than using digitized photographs to illustrate your da-

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How I Made It Pay

We all deserve to get lucky once or twice in a lifetime. My lucky streak started about a year after I bought my first 64. My entire background is in the publishing industry, my degree is in journalism, and my nine-to-five job is with the local newspaper. So it was only natural that as I became more and more involved with computers I would want to write about them. By the same token it was easier to sell editors on my story ideas and reviews because I was already in the publishing industry. As a result, what began as a hobby has developed into a steady part-time job.

But before I began writing about computers I learned how to program my 64. I spent a lot of time and more than a few dollars buying magazines and duplicating program listings and then playing with the code to see what effect changes would make. Eventually, I felt some of my programs were good enough to offer for publication. That's how I got my foot into the paying side of the computer industry. But if I had believed in omens my efforts for program would have ended right there. The first publication to buy a program from me *(Creative Computing)*, paid me and promptly ceased to publish. Yes, they went out of business. So the first program to earn me a check never appeared in print—but at least I had proof someone was willing to pay for my "hobby." (Even though I felt a little guilty about the magazine's demise, I promptly cashed the check anyway).

Over the years, people keep asking me the same questions, which I have never seen answered in any publication. So, here are the questions and one software reviewer's answers.

Although I still enjoy programming (and find it more fun and challenging than any computer game), I know I have neither the talent, patience nor desire to go beyond what I've already done. And unless I go beyond BASIC programming, I can make more money writing articles and reviewing other programmer's work. But having the ability to program makes me appreciate the efforts and abilities of those who do produce and market commercial software. And I think my experience makes me a better reviewer.

Unlike most of the articles which appear in this (or any publication) this sidebar was not solicited. Normally Jim Gracely or Susan West, the magazine's editors, and I decide what I will write about months before deadline. But this one is different—it is personal. I've been lucky enough to get paid to evaluate software or hardware for half a dozen publications. And over those years, people keep asking me the same questions, which I have never seen answered in any publication. So, here are the questions and one software reviewer's answers:

The most often-asked question is: "Do editors tell you to say only good things about those products?" The honest truth is no. No editor I have ever worked for (and I've been paid by most of the editors of the major computer publications) has tried to influence my product reviews, nor has changed the content of what I've written.

Because I've worked almost exclusively for *Commodore Magazine* for the past three years, some of the people I've met at users groups have asked if I pull punches because the name *Commodore* appears on the cover of the magazine. The answer again is no. As one who has seen the operation of the magazine first hand (I am not an employee—instead I work by contract), I am amazed at how little influence the parent company exerts on what the magazine says or covers.

The editors have only placed three restrictions on what I write: (1) I have to be honest, (2) I must cover all the important details of a product (the magazine supplies reviewers with a written guideline to follow), and (3) I should try to comply with

Continued on page 102

Impressions OF THE World of Commodore

by Russ Ceccola

My assignment was simple: investigate a gathering of a myriad self-proclaimed Commodore "computerphiles" in Philadelphia on the first weekend of November. It was the first time I had been assigned to such a case, and I took no chances. I holstered my service revolver, donned my trench coat and fedora and headed toward the Philadelphia Civic Center for the first World of Commodore Show in the United States.

The suspects were in large numbers and grouped in tiny booths, selling and buying wares—no doubt illegal merchandise. I sneaked through the doorway and picked up a show guide that detailed the proceedings of the weekend. Keeping to the shadows was tough. Inside the foyer I decided to go undercover; I removed my coat and hat and stood in the light, perusing my show guide for any obvious signs of illegal sales.

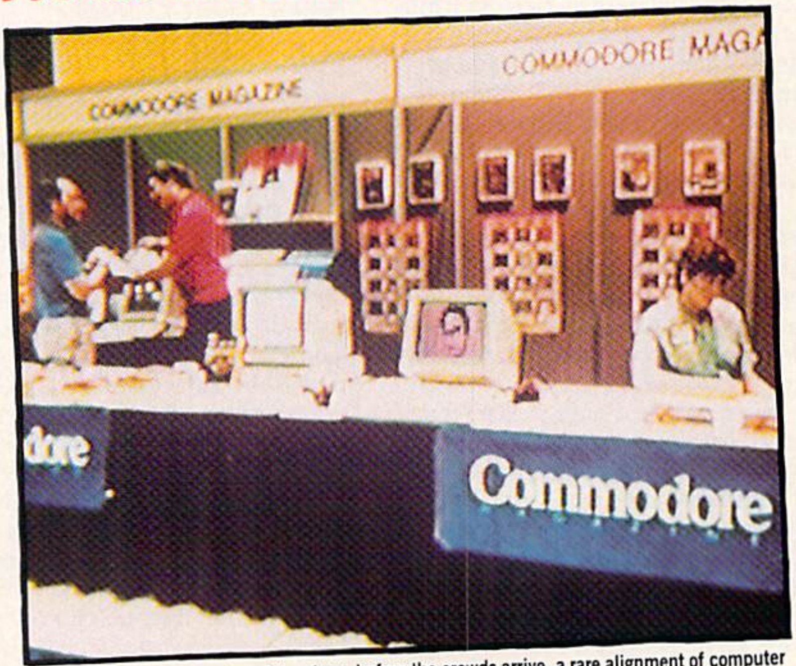
With scheduled meeting times and places spelled out in front of my eyes, I thought I had stumbled upon the bust of the decade. I decided to call for reinforcements. But before I risked using the phone, I took a peek inside the doorway to see what I was up against. Walking into the light inside the door . . .

. . . I was struck with an awesome sight—The World of Commodore in Philadelphia. Think this is *True Detective* or something? No way! This is *Commodore Magazine,* and the exciting events I'm about to describe took place at the first-ever U.S. World of Commodore.

World of Commodore was born in Canada, and for the past six years has enjoyed much success as an annual Toronto-based extravaganza. In fact, World of Commodore is the largest annual computer show held in Canada. But now the show is on the road—first in Philadelphia, and from May 19-21, 1989, at the Los Angeles Convention Center.

My real assignment was to make observations of the show, for the November showcase was the first Commodore show I had ever attended. After spending a couple of days in the exhibit hall, two things became obvious: World of Commodore means two things—a celebration of the computers that we have come to know and love and on which we spend our hard-earned money and a capitalization on the power of the Commodore computers by various software designers and companies. Let me describe each idea separately, so you will know what to expect upon your arrival at a Commodore show.

Impressions from the Inside



During the opening minutes of the show, before the crowds arrive, a rare alignment of computer peripherals within the exhibit hall induces a response on one of the monitors at the *Commodore Magazine* booth.

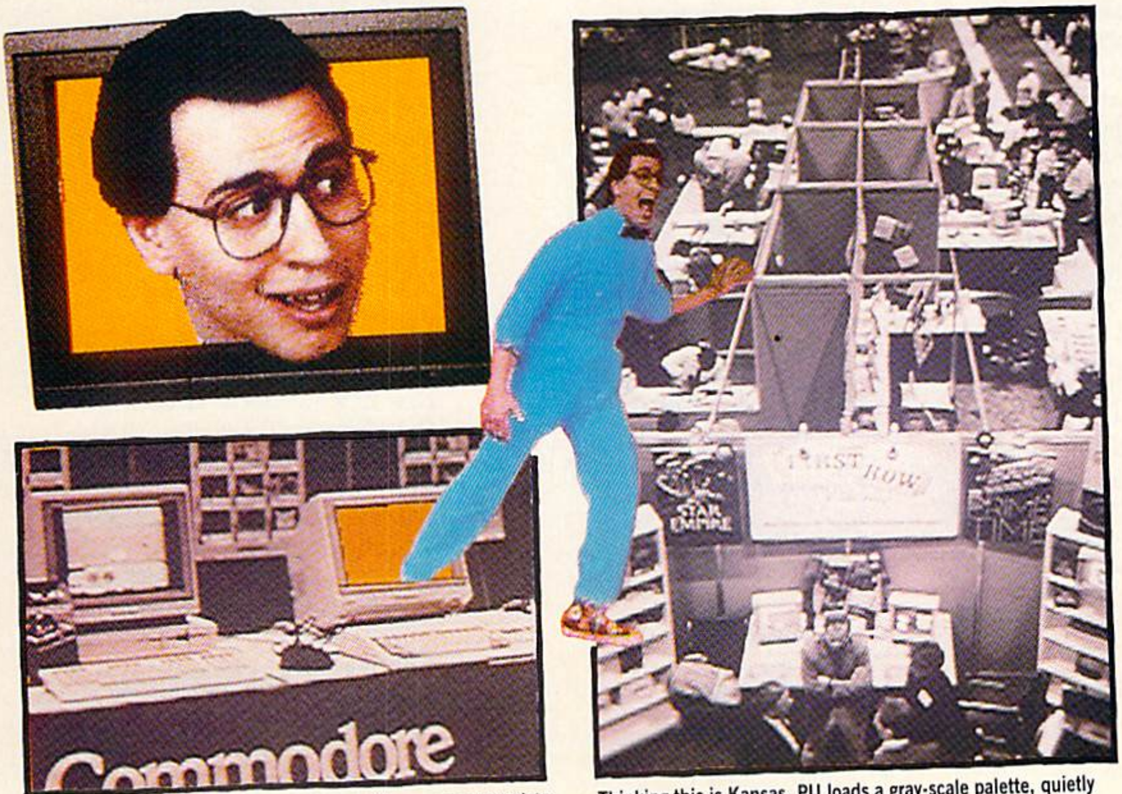
When I first walked in the door at the Philadelphia Civic Center, three things came into view. They were a booth with director's chairs and continuous showings of old *Honeymooners* episodes, a giant balloon with the *excellence!* word processor's logo and a giant Commodore tower. I'll get to these later. For now, let me justify what I said about the convention being a "celebration." As we all know (because we buy this magazine and own Commodore computers), our Commodore machines are powerful tools for productivity, creativity and fun. (And all Apple, Atari and IBM users can go wallow in mud!) Commodore computers are easy to use, have lots of software available, and have great graphics and sounds at reasonable prices. The possibilities for Commodore machines are endless. I should know better than anyone, for those are the four reasons why I bought my Commodore 64 over three years ago and have since bought a Commodore 128 and Amiga 500.

The companies exhibiting at World of Commodore share our enthusiasm for Commodore computers. These companies understand the incredible power per dollar of Commodore's computers and stop at nothing to make software for our machines because of this power. Just spend five or ten minutes with any Commodore computer and it's easy to be impressed. Impressing you was what all of the companies intended to do at this convention. This explains all of the exhibits, seminars and shows that took place during the convention. Let's talk about exhibits.

Exhibitors at the show included software companies, computer stores, software stores, publications (on paper and disk), user groups, hardware companies and—the company that started it all—Commodore Business Machines. [See box for a complete list of exhibitors.] Those *Honeymooners* episodes I mentioned were shown by First Row Software to preview their newest game based on *The Honeymooners*. The balloon was part of MicroSystems Software's exhibit set up to demonstrate their word processor, *excellence!* The bulk of the exhibitors were there to showcase their own personal triumphs in programming for Commodores, as well as to sell their products. A demonstration of a program to a potential customer with hands-on experience can be the deciding factor in whether to buy a product or not. At the same time, the buyer can instantly tell whether the product uses the power lying dormant in the computer—whether the product makes the best use out of what is available. This is exactly the dual role of celebration and capitalization at World of Commodore.

Commodore Business Machines, Inc. themselves sponsored a huge exhibit under that tower I mentioned in the back of the hall. Under the tower were many Amigas, 128's, 64's and Commodore PC compatibles running programs of various types for the visitors to see. You could play games, examine word processors or spreadsheets, draw pictures, make sounds and do everything that is possible with Commodore computers, free for the modest price of admission ($10), of course. Dozens of Commodore engineers and technical support representatives were on hand to answer questions and put the machines through their paces.

The arcade at the back of the hall featured a revolving selection of Commodore 64 arcade hits. Admission to the arcade (for a donation to Philadelphia's Children's Hospital) bought you a chance to play *Star Empire, Stealth Mission, Super Sunday, NBA, Silent Service, Up Periscope!, Microleague Wrestling* and others.



Suddenly an entity materializes. Quickly taking on an appropriate human form and appearance, It takes a look around. It rests for a moment, stabilizing its aspect ratio, before completing it's metamorphosis into . . . Power User!

Thinking this is Kansas, PU loads a gray-scale palette, quietly exits the monitor and begins to walk . . . Into the now-gathering throngs of unsuspecting show attendees.

Every now and then I'd go back to the arcade to escape the crowds—only to find tons of teenagers and little kids hogging the machines. Oh, well.

I have never seen so much software for Commodore computers so drastically reduced.

The show also celebrated Commodore computers with seminars and stage shows. A schedule of these mini-events was included in the show guide I picked up as I entered the exhibit hall. The stage shows featured the major new products previewed and displayed at the show and took place on a stage in the back of the exhibit hall with assistance from a 35-inch Mitsubishi monitor (lovingly referred to by Commodore insiders as "big brother"). Most of the exhibitors had a stage show sometime during the weekend. The seminars were useful discussions that ranged from one to two hours. Because of time constraints, I saw only a couple of them, but I could see that the curious had their doubts removed and questions answered, and the seasoned Commodore pros (like myself) learned something new too. Seminar topics included: Commodore in Education, Amiga Music Made Easy, Telecommunications Clinic, Word Processing Clinic and Desktop Video.

Commodore sponsored both a Commodore 64/128 Clinic and an Amiga Clinic. At the Amiga Clinic Gail Wellington (Commodore's General Manager, Worldwide Software and Product Support) explained why projects like AmigaDOS 1.3 take longer than originally projected: "The first 90% of the project takes 90% of the time, and the last 10% of the project takes the other 90% of the time." Gail's return to Commodore after an illness was celebrated during World of Commodore at a reception in her honor hosted by Bobby Kotick of the Disc Company.

As I said at the beginning of this article, The World of Commodore show serves a dual role as both a celebration and capitalization on Commodore computers. The exhibitors sell their merchandise, local software stores and mail-order companies clear their stock, hardware companies take trade-ins and make deals, and various magazines and user groups accept subscriptions and memberships at reduced rates. The important thing to notice about all of these things is that incredible discounts are offered. I have never seen so much software for Commodore computers so drastically reduced. In the Commodore Store, some of the older Commodore 64 products (produced by Commodore) were marked down to two dollars.

Other savings could be found around the hall as well. The software retailers and software publisher representatives constantly marked down their product to garner sales. By the show's end, prices were a lot lower for various products around the exhibit hall. *Remember:* the last day of the show is the best if you're looking for a good deal. Regardless of what you wanted, you could find it at World of Commodore cheaper than you would at any store.

Commodore's dealers kicked off the special Amiga 500 holiday offer during the show. To promote the offer (buy an Amiga 500 with 1084 monitor and special software bundle, get a free VCR), Commodore donated an Amiga 500 system (with VCR) to be raffled off in the *Commodore Magazine* booth. The lucky winner was Gil Sweigart of Akron, PA.

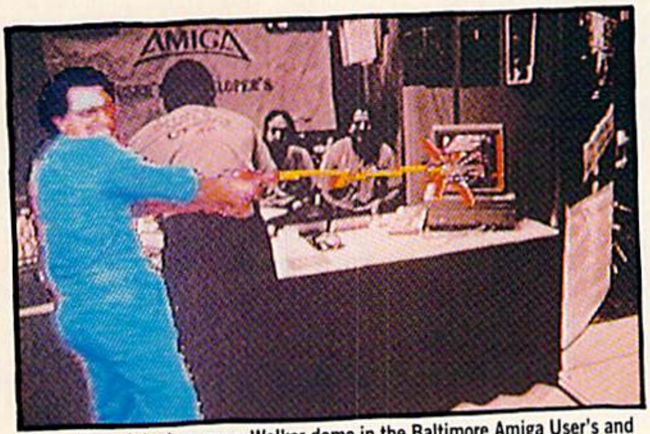
You can see how the words *celebration* and *capitalization* go hand in hand at the World of Commodore. Although people did hope to make sales, all of the exhibitors were friendly and more interested in showing me their products than taking money from my wallet. The general idea of the show was to let the products sell themselves. And that they did. Listening in on conversations, I noticed how people were impressed with certain products and the convention as a whole and wanted to see more. Most importantly, the visitors were happy that they had invested in Commodore machines. Aren't we all?! So, as I left the hall . . .

I realized that I had stumbled upon the

Exhibitors at The World of Commodore in Philadelphia

A-Squared Distribution, Inc.
Abacus Software
Actionsoft
*Ahoy!*International, Inc.
AM News Magazine
ASDG, Inc.
Avalon Hill Game Company
Ax Productions
BAUD User Group
Bobco
Berkeley Softworks
Briwall
Brown-Wagh Publishing Co., Inc.
Burocare Graphic Design
C & M Electric
CW Communications
Central Coast Software
Chip Level Designs
Commodore Business Machines, Inc.
Commodore Magazine
Comp-U-Save
Compute! Publications
Comspec Toronto
Creative Micro Designs
Digital Creations
Digitek Inc.
Disks & Labels to Go
Expert Services
First Row Software
Free Spirit Software
Gold Disk, Inc.
Golden Hedge, Inc.
Great Valley Products, Inc.
Haitex Resources
Hands On Software, Inc.
Hilside Hard & Soft Computerware
Inforite Corporation
Irwin Magnetics
Jersey Amiga Users Group
Kids Computer News
Mercury Software
Michtron/Microdeal
Micro League Sports
MicroProse Software
Micro-Systems Software
Mindware International
Moniterm
New Horizons Software
NewTek, Inc.
New York Camera & Video
Oxxi, Inc.
Phil Amiga Users Group
PIM Publications
Pittsburgh Commodore Users Group
Precision, Inc.
Progressive Peripherals & Software
Quantum Computer Services, Inc.
Softdisk, Inc.
Software Hut
Software Support International
Software Visions, Inc.
Southeast Pennsylvania User Groups
Spirit Technology Corp.
SubLogic Corp.
Supra Corp.
The Guitar Connection

major find of my career. I quickly redressed in my mock-spy's outfit, left the Civic Center and headed back to my unmarked car. I decided not to call in for reinforcements and headed back to the precinct, pretending ignorance of the convention. After finishing up my work for the evening, I went home. I was proud of my investigative skills, but even more proud of my newly acquired toys—a Commodore Amiga 500 and a copy of *Sex Vixens From Space!*



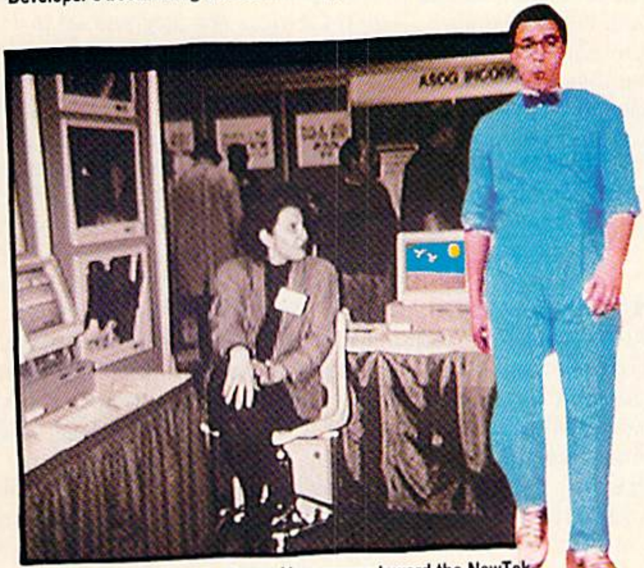
Power User detects a rogue Walker demo in the Baltimore Amiga User's and Developer's booth firing indescriminately into the crowd and neutralizes it.



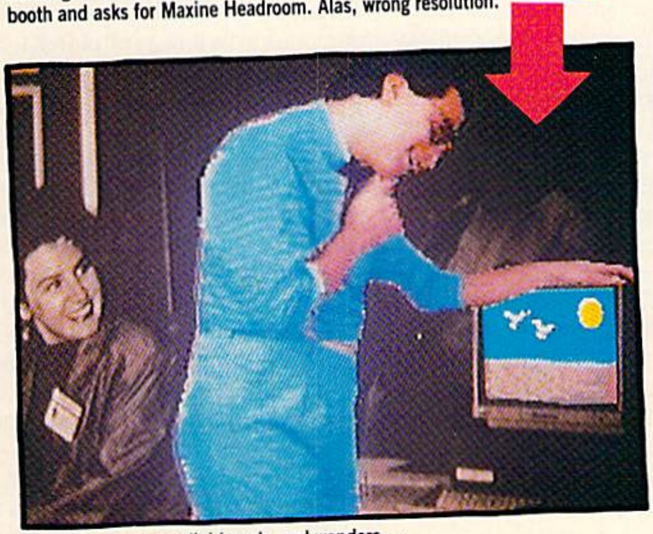
Moving on to a Telecommunications Seminar, Power User keeps the crowd under control.



As Jim Gracely and Gordon Hunter are selecting the lucky winner of an Amiga 500 Fast-Forward system, Power User boldly leaps into the spinning ballot barrel. A moment later PU surfaces, unharmed, holding the only correctly completed entry form.

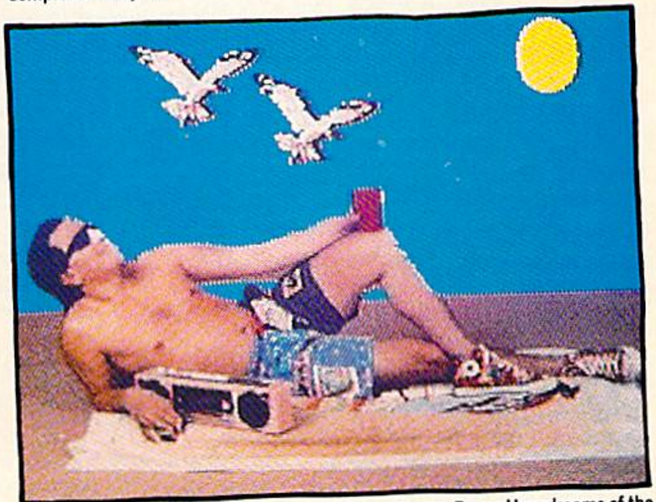


Sensing a kindred spirit, Power User moves toward the NewTek booth and asks for Maxine Headroom. Alas, wrong resolution.



Power User spies a digi-beach, and wonders...

MODEL PHOTOGRAPHY, DIGITIZATION: MARSHALL M. ROSENTHAL
BACKGROUND PHOTOGRAPHY: CHARLES BARTHOLOMEW
ADDITIONAL ART: I. DELAROSA. MODEL: RICHARD LIBLICK.
PROGEN, PROGRESSIVE PERIPHERALS. *PHOTON PAINT 2,* MICROILLUSIONS.



Basking on the silicon beach in the raster's warm rays, Power User dreams of the next World of Commodore.

by Jeff Spira

Looking Ahead

Viruses, Worms and Trojan Horses

This is the first in a series of articles examining some of the more interesting aspects and future applications of computer technology. These concepts and ideas are presented not as speculation, but more as extrapolation from current technology to take a look at the directions this technology might take. Some of these extrapolations may sound like science fiction, but we are entering the age where science fiction can become science fact in a very short time.

When most of our fathers were young men, I'm sure they considered the concept of a man walking on the moon no more possible in their lifetimes than we consider travelling at the speed of light, yet it happened. Consider that that event first occurred before today's high school seniors were even born! We live in an age where changes come fast. The database of knowledge in electronics alone is doubling in size every two years. While the hardware advances seem to come fast, the speed of the advances in software state of the art is at least triple that speed. This series will examine some of these advances and take a peek at where they might be going. Your comments and input will be greatly appreciated as we begin . . . Looking Ahead.

The newspapers and TV news have been alive with the late-breaking stories: "Virus Invades Defense Computer," "Worm Program Wipes out University's Records," and a whole bevy of others. Just the names *worm* and *virus*, evoke stealthy, evil and destructive connotations. Yes, even your very own computer may be exposed to infection from a seemingly-innocent shareware program disk or down the phone line as you peruse your local BBS.

There have never been adequate definitions for worms, viruses and other such stealthy pieces of code, but Bill Buckley, author of the first worm program, published in *Scientific American* May 1985, offers two that are as good as any: A *worm* is a piece of code that moves itself about in a computer's memory. A *virus* is a piece of



ED SAUK

code that attaches itself to some other program. Whether these programs replicate themselves or do something destructive is merely a characteristic of the program.

There are other unwanted, destructive pieces of software out there as well. One example is the "Trojan Horse," a program that purports to do one thing and does something entirely different. Trojan horses have been written to do such dastardly things as reformat your hard disk.

Viruses

To date, the use of viruses has been limited to unscrupulous "vandals" hoping to make their mark on some unsuspecting user's system. Like street graffiti artists, they attain little more gratification than being able to brag about being the responsible party to their friends.

The truth about most viruses is that they are fairly easy to detect. If they are indeed attached to another program, a simple directory command from the DOS will reveal that the suspected infected program is larger than an uninfected version of the same program. Real problems, such as those we've been seeing the past several months, arise when the virus is endowed with the ability to reproduce. The virus happily goes about reproducing itself, consuming more and more memory and spreading across a network of computers. Like its biological namesake, the virus can spread and infect every computer it comes across. This though, is also little more than a prank because by reproducing and growing, the virus becomes apparent as it consumes gigabyte after gigabyte of available memory and computer user operations slow while the CPU struggles to service all of the ensuing activity.

Viruses have been programmed to do a wide range of things. Some are totally benign and merely announce their presence occasionally with a message on the screen. Others lock up the RAM of the machine by filling it with gibberish requiring a reboot of the system. Still others attack and destroy or totally scramble disk files. Note that these are all overt acts designed to suddenly make the user painfully aware that his system is infected. Viruses may be programmed to begin their mischief on a certain date by monitoring the computer's clock. They may also kick into effect by an event of some sort, (for example, when the C:8 cell of your spreadsheet reads 38.40). You may go years and years before that particular event occurs, but once it does, the virus becomes active, and there goes your hard disk files or whatever the virus was programmed to do.

Worms

The worm program, though is far more insidious than it's virus counterpart. The worm is to a virus as a secret agent is to an army. A worm program, by definition, is a piece of software that is able to move about the RAM of a computer. This concept was first outlined in John Brunner's science fiction book *Shockwave Rider* published in 1975. In this scenario, the hero writes a program that stealthily enters the government's supercomputer moves about without detection, and subtly alters his own records of existence.

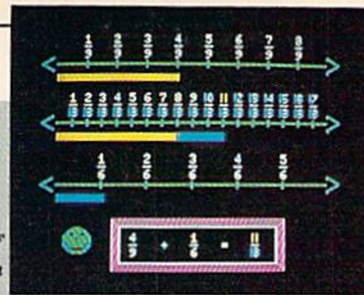
Such a worm has not yet been written, but even as you read this, strides are being made in that direction. Serious programming efforts are being directed at a worm that is undetectable and can be programmed to do a number of tasks. Because a worm has the ability to move itself, it can be designed to camouflage itself by staying constantly on the move and avoiding areas of RAM in use. A debugging program can only look at one small area of RAM at a time. Looking through megabytes takes time. It's somewhat akin to looking for a grasshopper on a football field using a microscope that can see only one square inch of grass at a time. Every time you get close to the grasshopper, it simply jumps to another location. Once it scans a certain area of RAM, the worm simply isn't there—it has moved somewhere else. To develop a worm with the ability to be undetected is not an overly easy task, but to develop one that

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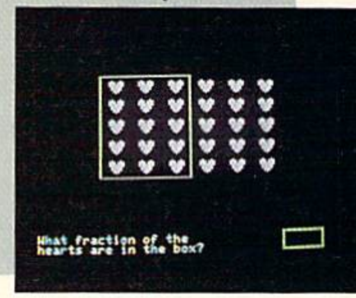
by Howard Millman

Arithmetic and Fractions

Educational software that sustains a child's interest while teaching fundamental building-block concepts can be hard to find. We'll look at programs that do just that.



Piece of Cake Math



Fraction Factory

Piece of Cake Math and *Fraction Factory* automatically adjust the difficulty level.

Not everyone in Detroit owns a Chevy, likewise not everyone in Japan owns a computer. According to a report released by Japan's Computer Education Development Council, about half of the surveyed schools complained about a lack of computers and a shortage of high-quality educational software.

Halfway around the globe, the U.S. Office of Technology Assessment's report, "Power On!," reports similar shortages in American schools. It's interesting to know we share at least one common bond with the Japanese educational system—inadequate funding.

Now on to this month's selections—for those who *have* computers.

Piece of Cake Math
Computer: Commodore 64
Ages: 7–13
Price: $34.95

Fraction Factory
Computer: Commodore 64
Ages: 8–14
Price: $29.95

Publisher: Springboard Software
7808 Creekridge Road
Minneapolis, MN 55435
(612) 944-3912

Emphasis: Basic math skills employing integers and fractions.

Both programs share similar qualities including progressive difficulty ("branching"). Based on the student's accumulated performance, the challenge increases proportionally with the number of questions answered correctly.

Just as the difficulty level is progressive, so are the levels of help. When the student chooses a wrong answer, the system offers help in four steps—first offering clues and eventually concluding with the answer. Since it doesn't concede an immediate answer, students will find it less burdensome to probe for the correct solution rather than entering a wrong number to indulge the program.

Both programs are slow loading, however, once loaded they reside completely in memory. Switching selections is fast and seamless. Tapping any of the four function keys moves from one segment to another or exits the program. The initial main menus are either pictures or words, CONTROL/W toggles between the two choices.

These manuals, like all of Springboard's manuals are lucid and terse.

Piece of Cake Math

Springboard employs the concept of bakery products to emphasize math concepts. Each of the program's five segments emphasizes either the addition, subtraction, multiplication or division of cakes. Actually, they more closely resemble pies, but that's only crucial to carbohydrate connoisseurs like me. The latter two segments, Flashcards and Catchacake, emphasize drill and practice as problems sequentially flash onto the screen. All numbers are positive whole integers.

Catchacake offers the additional benefit of being either a single or multi-player game.

Flashcards offers practice in addition, subtraction, multiplication or division with five user-selected difficulty levels in each group ranging from Beginner to Superman. While the program automatically branches, the process can be accelerated by entering CONTROL/J.

Fraction Factory

Fraction Factory uses a similar approach except, of course, it deals only with fractions. And does it ever cover the topic.

Its five segments touch on all aspects of dealing with fractions. As with *Piece of Cake Math,* the program automatically adjusts the difficulty level. *Fraction Factory* omits a user-selected difficulty level.

In Fractions and Sets, objects are aligned on the screen, the number of objects varies from one problem to the next. A box is drawn around some quantity of these objects. What part of the whole does the box enclose? Answers are expressed as fractions, the first number is automatically the numerator, the second entry is the denominator.

This contrasts to Fractions of a Number in which the student multiplies fractions ($\frac{2}{3}$ is what part of 6?). Answers are whole numbers.

Equivalent Fractions converts fractions from one denominator to another. Frequently this is a two-step process using an intermediate denominator ($\frac{3}{4}$ equals $\frac{7}{6}$).

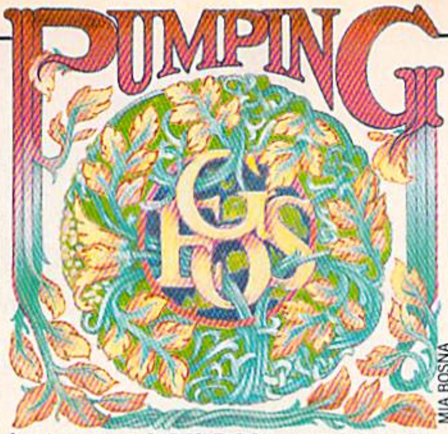
Adding and subtracting fractions likewise requires converting to a common denominator to solve the question. On-screen displays graphically illustrate relationships between dissimilar denominators $\frac{2}{3} - \frac{5}{12}$).

As has happened occasionally in the past, I really got myself snookered while testing the advanced fraction subtraction. And, as I rationalized then, so do I again: I'm temporarily a tad rusty at this stuff.

Despite one of them somewhat confounding me, Springboard has two keepers with these math programs.

On a scale of ten they rate:
Content: 8
Ease of use: 8
Error/Help feedback: 9
Graphics and Audio: 6
Manual's clarity and organization: 6

Continued on page 105



MIA BOSNA

by Mark Jordan

Importing Bitmaps into *geoPublish*

Berkeley Softworks' series of GEOS-compatible products opens up a world of opportunity to Commodore users. Take some tips from Mark Jordan and soon you too will be Pumping GEOS.

Recently I received a letter from a disgruntled user of *geoPublish,* a Mr. J. Grove from Chicago, Illinois. His letter stated that he is "forever tired of hearing about the 'wonderful' aspects of Berkeley's GEOS series of programs. Disk-swapping, waiting, keyboard crashes are among the features nobody ever talks about." He also stated, "*geoPublish* is an overly cumbersome, time-consuming, less-than-friendly program."

I did not escape Mr. Grove's wrath: "I read his [my] article, hoping that I could find morsels of information that would make using *geoPublish* a less cumbersome task, but that wasn't the case." And "to print an article that suggests the user is going to jump right into desktop publishing is misleading—if not downright deceptive."

Mr. Grove's letter was valuable to me in spite of the fact that he indicted me in it. For one thing, it lets me know some of my readers' frustrations and helps me plan future columns. For another thing, this gives me an opportunity to outline my philosophy behind this column. Which, starting now, I shall do.

My thesis: GEOS is a product that opens doors for eight-bit computer users. It is the best and only one of its kind. To downgrade Berkeley for some of the inherent weaknesses of an eight-bit computer is akin to criticizing a high schooler who just set a state record in the mile because his time was slower than the world record. GEOS is a good software value.

One must see GEOS in perspective. Anyone who has been involved in computing for several years knows that graphics-oriented operating systems for all practical purposes began with the Macintosh. They also know that the Mac had a tough row to hoe, that "power users" from the business (read "MS-DOS") crowd thought pointing at cute little pictures with a mouse was absurd. And anyone who has stuck with computing knows that even that crowd is now trying to brag about its ability to use mice, do desktop publishing, work with windows and icons.

I state this to underline the importance of the graphic interface. Brian Dougherty (Berkeley's founder) saw this and decided to see if he could do it with an eight-bit machine, the Commodore 64. Here was a computer with a huge (the hugest) installed base—why not "go graphic" with it? His task was not an easy one: he would be working with an old engine, the 6502, and with a notoriously slow disk operating system. He also was strapped with memory constraints because, at the time, 64K was max on the Commodore 64.

GEOS is the result and it absolutely works. It isn't as good as its brethren on the 16-bit machines, and it never will be. But nobody complains that a four-cylinder Toyota tops out at 85 mph because nobody buys a Toyota for racing.

Not only does GEOS work, it continues to evolve, as the Beatles said, "It's getting better all the time." Have you tried it with two disk drives? A wonderful improvement. Got an REU yet? Amazing results. Upgraded to 2.0? You better because it's worth every penny. Recently I reported on a new package called *geoChart.* This is just another sign that GEOS is growing bigger. Furthermore, in a recent phone conversation Mr. Dougherty hinted at wonderful things to come (like entertainment software, version 2.0 for the 128, *geoBASIC,* and more.)

In toto, I defend GEOS not because it is the be-all, end-all of computing, but because it stretches the creative usefulness of my old friend, the Commodore 64. As a writer of a GEOS column, I feel my job is not to concentrate on the weaknesses of the product (though report them I must, particularly destructive bugs). My job is to increase understanding and usefulness of the product. I also try to inspire, to give ideas to readers on how to use GEOS. I even try to give suggestions to Berkeley through my articles (are you listening, guys?) And finally, I try to have fun with the product. I personally have read too many computer columns (not in this magazine, of course) that are just plain boring.

Alas, Mr. Grove's letter makes me think that I didn't improve his understanding of *geoPublish,* that he was less than inspired, and that he wasn't having much fun with the product. I accept the blame. I failed.

Sigh.

But wait, it's never too late to correct an error (until you die). Maybe I did gloss over a few of the finer points involved in using *geoPublish.* One of Mr. Grove's biggest concerns was that he didn't know how to import bitmap graphics. Therefore, I shall dedicate the rest of this month's column to explaining just that. And, if you dear reader, have been scratching your head over some aspect of GEOS, drop me a line. Who knows, you might get your name in this column as prominently as Mr. Grove did.

Importing Bitmaps into *geoPublish*

If you are really going to pump GEOS, you better learn how to use the Photo Manager. This is the half-way house between *geoPaint* and the other GEOS applications. It isn't hard to use once you get the hang of it; it's just slow (unless you have an REU).

The Photo Manager is a desk accessory that handles bitmap graphic images. An accessory is a program, just like a word processor, but instead of handling word files, it handles photo files. It does so by means of a collection of photos which GEOS calls a photo album which you must create. To do that, you first must be sure the Photo Manager accessory is on your disk. I think it's a good idea to put a Photo Manager on all your application disks.

Step two is to go into *geoPaint* and do some drawing. Then use the Edit Box to select a region to copy. Instead of using the "Copy" box in the bottom of the screen, go to the Edit menu and choose either "Cut" or "Copy." Obviously, if you don't wish to remove the region outlined, then don't select "Cut." This invisibly creates a "photo scrap," the first step in creating or adding

Continued on page 66

Pumping GEOS

Vol. 1, Num. 7

A New Way to Program

Here's something you might never have thought about before: a computer program is nothing more than one big, long number. Any program, every program. Your disk drive feeds this gigantic figure into your computer's memory in a series of bytes.

For instance, if the first byte in your program is a 65 (01000001 in binary) and the second one is a 15 (00001111) then stacked side by side they become 0000111101000001 which is 3905 in decimal. And so it grows until you have one huge, whompin' number. A 20K program would be a 163,840-digit number written in binary.

Now here's what's interesting: what if a programmer, instead of laboring over computer code for months, simply typed in great big random numbers until he got one to do something. Or better yet, he could write a simple program that would feed these numbers in continously while he sat back and watched the screen until a spreadsheet, wordprocessor, or arcade game appears. Think of the development time and effort it would save. Great idea, eh?

Yes, it is, but alas, it will never get tried. Why not? Because people are too resistent to change. Do it the hard way, the tried and true way.

Well, I'm not afraid of change. Let's see, I think I'll try this one: 0 1 1 1 0 1 1 0 1 0 0 1 0 0 0 0 0 0 0 1 1 1 0 1 0 1 0 1 0 -- No wait, make that 0 1 1 1 1 . . .

V e r t i c a l

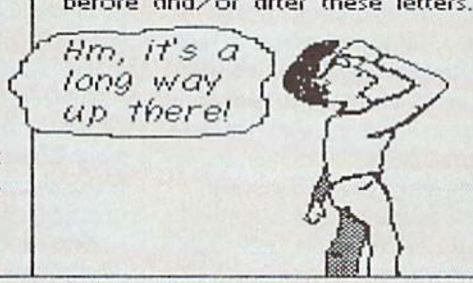
Take a look to the left and right of this article. You probably knew that geoPublish was able to print headlines vertically. But look closer. This time the letters remain upright, not sideways as will happen when you use the UP or DOWN orientations from the edit menu (like the "Pumping GEOS" logo).

Here's how do you do it:

1) Select text and place the crosshair where you want the upper-left corner to be heading
2) Type your heading, pick its attributes, etc.
3) Exit edit and click on the resize gadget -- in the lower-right of the text box
4) Pull it down and to the left until your text box is a tall, skinny box
5) Voila! Text prints vertically.

The only trick is to size the box correctly. If you make it too wide, you'll get more than one letter on some lines. Too narrow and nothing happens. Fortunately, the solution is simple -- resize your text area and try again.

There is another trick to it. You'll probably need to go back and edit the text because some skinny letters -- usually I and L -- will stay on the same line as another letter. The solution again is simple: just type a space before and/or after these letters.



H e a d i n g s

Printing with a 60 dpi Printer

If you're stuck with a 60 or 72 dpi printer, you may feel you aren't getting the full glory of GEOS, particularly using geoPublish. It isn't as bad as it might seem.

For one thing, text printed with these printers seems to be easier to read. The letters are stretched out just a little.

This leads to another subtle benefit -- you can use a smaller font size and still keep your text readable.

Plus, Berkeley is presently working on printer drivers that will be much higher resolution for all printers. Berkeley founder Brian Dougherty told me that he's seen printouts done in 60 dpi format that looked laser-sharp.

This page of "Pumping GEOS" was done on my Star NX-10C, a 60-dpi printer. Normally I use an 80-dpi printer. So, if you want to see the difference, grab last month's issue of this column and compare.

Continued from page 64

to a photo album.

Next step is to go to the GEOS menu and select "Photo Manager." After some huffing and puffing (boy, would an REU be nice) you'll be asked whether you want to create a photo album or open an existing one. Click "create" and follow the prompts to name it. This name will become our reference for re-opening this album, so try to give it a meaningful name.

Once done you will find yourself staring at the Photo Manager window. This window covers approximately half the screen. It has a page-flipper in the lower left just like the Notepad. It has a strange gadget beneath the page-flipper that looks like the rectangle at the top of a *geoWrite* screen. It functions in the same way: if you have a photo in your album that is bigger than the window, you can use this rectangle to move about and view the entire thing.

The only other thing on the screen of any consequence is the Command menu. Two options—File and Edit—are up there on the command line. Since we just created a photo scrap moments ago, let's get it and store it as our first photo in the album.

Go to the Edit menu and select "Paste." More huffing and puffing. Behold, there's our photo scrap. Now our photo album has one picture in it.

Okay, there's nothing else to do here, so go to the File menu and select quit. Huff! Puff! We're back to *geoPaint*.

Want to put another scrap into the album just to see how? Just repeat the process of selecting and copying (or cutting) something on the screen. Then back to the Photo Manager, select the album just created (in version 2.0 of GEOS this step is unnecessary), and you'll find yourself staring at the former photo scrap. Go to the Edit menu, select "Paste," and (huff/puff) you're staring at the new scrap. If you glance up at the command line, you'll notice that this new item is called "Photo #1." Our previous photo is now "Photo #2." To see it you'll need to use that page-flipper. Click it and there the old boy is.

A Scrap or a Photo?

The GEOS manual states emphatically that one needs to understand the difference between a photo scrap and a photo album image. The scrap is temporary. It is the result of either cutting or copying from the Edit menu. Each time you cut or copy a graphic region on your screen, you are erasing the previous scrap and creating a new one. In essence, you never directly move photos between Photo Album and applications—you deal with scraps.

You can often avoid using the Photo Manager to move graphics around, a technique that can save time. For instance, if you need a chart for a *geoPublish* document, you can enter *geoPaint*, draw the chart, use the "Copy" command from the Edit menu, exit *geoPaint*, re-enter *geoPublish*, then import the bitmap directly without using the Photo Manager at all. (More on how to import directly in a few minutes.) Normally, however, you'll want to go through the whole process of saving the scrap to a photo album. That way, it's always there.

Once you've got a photo album together, it's quite easy to incorporate the photos in it into a *geoPublish* document. First, you need to put the following on one disk: the Photo Manager, the particular photo album that contains the bitmap images you need and *geoPublish*.

Once you're into *geoPublish*, you need to activate the Photo Manager. It's available from the GEOS command line menu (as long as you placed it on the disk). From the Photo Manager, copy the photo (bitmap image) you want via the Edit menu (use "cut" or "copy"), and exit the Photo Manager. You have just created a photo scrap on your disk. *GeoPublish*, as you know, has three modes of operation: Master Pages, Page Graphics and Page Layout. You can import bitmaps in any of the three modes, but the method is slightly different for Page Layout than the others. First, let's look at how to do it in the Master Pages and Page Graphics modes.

From either Master Pages or Page Graphics, first get your photo scrap in place. This means going to the Photo Manager and cutting or copying the photo image you want.

Next click the bitmap tool (it looks like a box within a box). The pointer becomes a crosshair. Move your crosshair to the upper-left corner of the place you want your bitmap to go and click. The bitmap will write to the screen.

All is fine at this point. But what if you didn't place it quite right? Or what if you would like to stretch it out a bit or change some other attributes?

To change the bitmap's attributes, you first must click the attribute tool in the toolbox. It looks like a box divided in half diagonally. Clicking this will bring up an options window. You can elect to center your bitmap, scale it, or stretch and scale it. You can also elect to use a pattern other than black for all the set bits in your bitmap. And finally, you can elect to have your bitmap that's either transparent or opaque.

What will all these options do? Here's a quick run-down:

- **Centered:** the bitmap will be centered in the area you define.
- **Scaled:** the bitmap will be stretched to fit the area defined but will not change its proportions vertical to horizontal.
- **Stretched and scaled:** the bitmap will be stretched to fill up the box however you shape it.
- **Transparent:** the bitmap will allow any text or graphics beneath it to show through the unset bits.
- **Opaque:** graphics beneath the bitmap will not show through.

After you select the options of choice (default is centered and opaque), you'll need to select your bitmap. Use the pointer icon and click anywhere on your bitmap. Then you'll see an outline box surrounding it with the two familiar gadgets in the opposite corners. Use the gadget in the upper left to move the bitmap. Use the lower-right gadget to re-size it. The bitmap will be re-drawn to the specifications you choose from the attributes window.

To place a bitmap into your *Publish* document from the Page Layout mode, you'll follow a slightly different procedure. First, use the Open Region tool (a dotted box). Move your crosshair to the page area where you want the upper left of your bitmap, click, pull your region outline down and to the right and click when you have defined a region of the appropriate size.

Click the pointer tool. Select the region you just defined. Click on the bitmap tool. The options window will come up. Make your selections. Then click "OK," and the bitmap will be in place.

Once a bitmap has been imported, it becomes a part of the *Publish* file. You can now get new photo scraps and import more bitmaps. A lot of work? Confusing? I don't think so, at least not after you've done it once or twice. I will admit to being a bit confused as to why the operation is not similar in all modes, but it's not a big problem for me. I am a programmer as well as a writer, and I know that sometimes things just don't work out so neatly. There are many considerations in designing software.

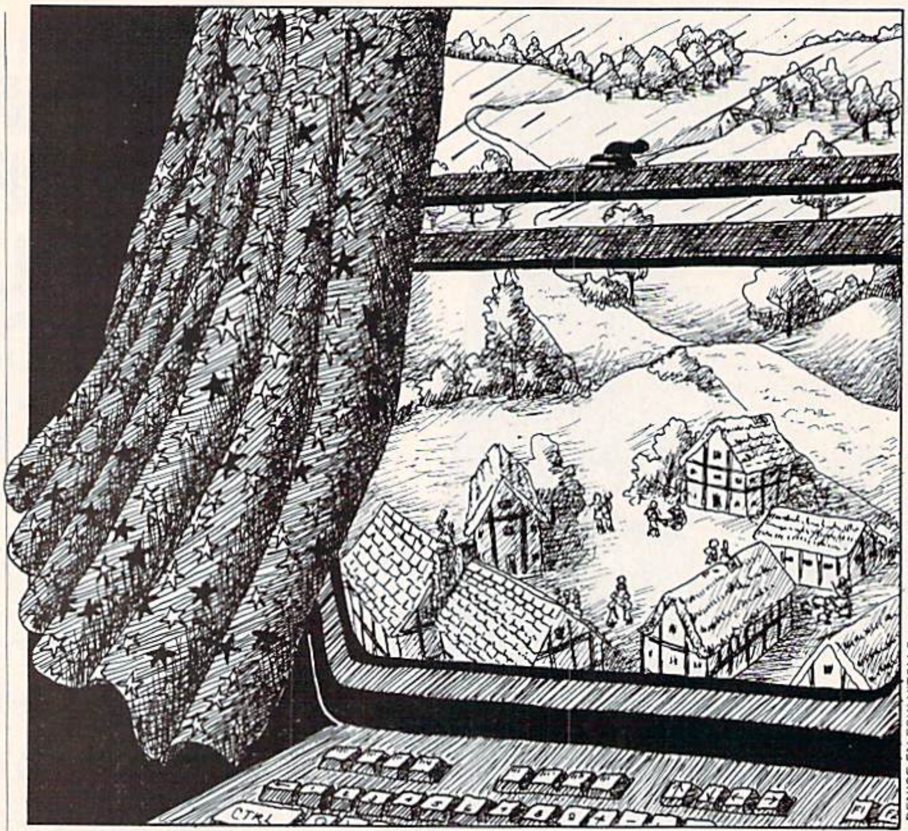
It's been quite a workout this month. Next month I want to take a serious look at another branch of the GEOS family: the numerical branch. It's time to delve into *geoCalc*.

Ciao.

by Shay Addams

New Windows on Adventure: *Times of Lore and Neuromancer*

News and opinion from a leading explorer of those fantasy realms called adventure games.



DENISE FALESKI VITOLLO

Action adventures are my least favorite form of adventure game, which is a civilized way of saying I don't like them at all. These "shoot-'em-up-in-a-maze games" are usually so shallow in terms of plot and character interaction, they often give me the impression their fantasy worlds were invented solely so the programmer would have a place to try out his new combat system or animated effects.

That's not the case with *Times of Lore*, a Commodore 64 game that opens a new window on the action adventure—for the first time, you get to interact significantly with other characters by talking with them. There is no "type in the words" parser, but this part of the interface results in a feel similar to conversing with people in the last two *Ultimas*. Upon meeting one of the 60 different characters, you can click on the mouth icon to speak. His initial response appears in an oblong window at the bottom of the screen, then a smaller one materializes beside it and displays your potential replies, such as "start chichcat" or "ask question."

Depending on your selection, this menu may contain different choices the next time. "Chitchat" with a barkeep at the Frothy Slosh Tavern will net you a rumor about orcs in the Dark Forest. Click on "ask question," and "rumors" and "orcs" appear in the menu as your next choices. Choosing a key word that shows up in the menu ("orcs" in this case) often starts or continues a brief conversation, as is the case in *Ultima*. It is this aspect that distinguishes *Times of Lore* from all preceding action adventures, giving it as much—if not more—depth as some dedicated role-playing games, such as *Shard of Spring* and *Questron II*.

Speaking of *Questron*, you'll see a familiar effect when you enter or leave one of the 45 different buildings: the top pops off as soon as you walk in, affording an aerial view of the interior; it pops back on when you leave. (Actually, this effect was introduced in *Legacy of the Ancients*, which was created by the authors of *Questron II*.)

Also seen from overhead, the landscape is finely detailed and colorful, with shadows beneath the trees to provide a clever 3D effect. Rogues and orcs, priests and peasants—all the NPC's (non-player characters) are represented with distinctively-drawn and animated figures. Sound effects are also above average, with varying tunes, birds chirping and so on.

All actions are conducted with the joystick. To move, you just turn the stick; holding down the button simultaneously caused your orc-slayer to swing that sword at the nearest monster. Other tasks, such as examining, grabbing, dropping or giving things to people, are handled by punching icons at the bottom of the screen. You can also check your score, load a saved game or pause the action. The only drawback I saw is that your character has but one life and no resurrection powers, so death means you've got to restore a saved game. At least you can do so by merely leaning on a key, and won't have to wait for the entire program to reload.

The plot is revealed in a series of intricately-illustrated screens that tells the tale of King Valwyn in the land of Albareth, where he defeated an invasion of barbarians 20 years ago. The King then took an extended vacation, promising to return by now—but he's nowhere in sight, and as you may have guessed, those barbarians are back in town. Only his Medallion of Power can save the kingdom, and in order to summon him back to the land, you've got to find the Foretelling Stones, Tablet of Truth and Ring of the ArchMage. In an unusual move for such a game, it lets you choose your character's class, one of which is female.

Mapping is the least of your problems on this quest, for an exterior map of towns, paths and rivers is included. This frees up your time for more interesting and fun activities: fighting monsters, figuring out the effect of the potions and scrolls (yes, you can cast a few spells too), chatting up people for clues, and fighting *more* monsters. Written by British programmer Chris Roberts, *Times of Lore* is naturally being marketed by Lord British's Origin (they recently shortened the name from Origin Systems). No plans are currently set for an Amiga version.

Neuromancer: Breaking the ICE

Even more drastically, *Neuromancer* also opens a new window on adventuring. Like me, you may have expected Inter-

play's role-playing game based on the William Gibson science fiction novel to use a version of the *Bard's Tale* or *Wasteland* game system. But Interplay introduced an entirely new interface and presentation scheme for what turns out to be one of the year's most original designs. It's a one-character game set in the year 2058. Instead of exploring dungeons, you'll break into databases of various mainframe computers to find passwords and useful gear. The immediate goal is to find out what's been happening to your "cyberspace cowboy" pals who've been disappearing lately while they were doing exactly that. As you proceed, two interesting plot twists give the story even more depth. A catchy musical score by Devo (digitized, with vocals in the title screen) plays intermittently throughout.

You begin by guiding your character (with keyboard or stick) through the streets of Japan's Chiba City, portrayed with a refreshing style of 3D graphics in a window that spans the width of the screen and about two-thirds the height. (This reminded me of Lucasfilm's *Maniac Mansion.)* Usually before you go "north" to the next location in the game, you only see the door through which you will move. When on the streets of Chiba City, you'll see buildings in the distance; walk north, toward the "back" of the picture, and you'll enter that distant part of town. Below the picture window, eight icons control actions such as inventory (which brings up a menu for using, dropping and manipulating things in other ways), talking to people, and six others.

Dialogue fills cartoon-like balloons over characters' heads. You talk by cycling through a series of potential statements and questions, then choosing one. Some balloons will say, "Tell me about ———," so you can fill in the blank by typing in a name or word. Other text is presented as messages on bulletin boards of various databases on Comlink, which is something like Q-Link or CompuServe. After finding a cyberdeck and some communications software, you can access these databases for clues; you can also send messages to people in hopes of getting some feedback. As you learn more linkcodes and passwords, you'll be able to download better software from the boards; by saving the money you make (or steal by transferring funds from someone else's bank account into your own!), you can afford superior hardware, perhaps a Ninja 5000 deck.

But accessing databases and interacting with Chiba City's inhabitants is only the surface of the game, for the real action lies in cyberspace, a grid that "represents information in its pure form." When you manage this feat, you'll enter a world that looks like a matrix filled with big jewel-like objects that house the actual databases. Defeat the ICE (Intrusion Countermeasure Electronics) that defends one of them, and you'll get inside it and be able to access higher security levels, where more powerful software and important clues lie hidden.

Battling ICE is like no other combat you've ever faced. Instead of swinging swords or firing lasers, you attack these computer programs with your own software: Decoder 1.0, Drill 2.0, Thunderhead 1.0, Blowtorch 4.0. Meanwhile the ICE is firing back at the same time, and its attacks can "crash" your software and make it inoperable. Some databases are guarded by even more powerful foes called AI's (Artificial Intelligence), also known as Black Ice because they can kill you. (You'll be resurrected in the Body Shop right away, although it will cost every credit you didn't have the brains to upload to your bank account.) Not all software is used for "breaking the ICE," for some serves more sophisticated purposes: Sequencer will figure out passwords, while Scout lays bare the number of levels in a base.

As in typical RPG's, skills play a role. But here you get them by purchasing skill chips that are surgically implanted in your brain! With the Cryptology chip, you can decode words, and others cover things such as Logic, Coptalk, Debug and Software Analysis. Determining when and how to use them presents yet another kind of puzzle.

Besides introducing a unique game system in a scenario filled with inventive puzzles, *Neuromancer* is also one of the funniest role-playing games ever, for the authors didn't miss a chance to show off their twisted brand of computer satire. Read the Consumer Review database's reviews of new hardware, for instance, and you'll learn that one model, the UXB, "exploded and put our reviewer in the hospital for two weeks." And the program takes a shot at a monk named Nolan (though it does not say his last name is Bushnell) in the House of Pong, a temple devoted to the "One True Computer Game." Covering both sides of two disks, *Neuromancer*'s available for the Commodore 64 now, with an Amiga version planned. (And it's completely unprotected, though you need a codewheel to access certain on-line systems.)

Continued from page 13

Look at the odds on the screen, then place your bet by entering the amount, a comma and the number of the horse you are betting on. When your bet has been placed, sit back and watch the action.
Ghislain de Blois
Timmins, Ontario
Canada

```
100 REM 64 HORSE RACE - G. DE BLOIS
110 N=RND(-TI)
115 M=500:DATA KELLSO,5,FORENO,9,
    TESSAN,7,DEHLIA,6,KELLEN,4,FIELLO,
    8
120 FOR X=1 TO 6:READ H$(X):READ OD(X)
    :P(X)=3:NEXT
130 POKE 53281,13:POKE 53280,6
    :PRINT"[BLACK]"
140 PRINT"[CLEAR,DOWN,SPACE4,RVS]
     64 HORSE RACE - G. DE BLOIS
    [RVOFF]"
150 PRINT TAB(14);"[DOWN]CASH $"M"
    [DOWN]"
160 FOR X=1 TO 6:PRINT"[DOWN,SPACE5]
    "X;"[RVS]";H$(X);TAB(20);"[RVOFF]
    ";
170 PRINT"ODDS";OD(X);"TO 1":NEXT
    :INPUT"[DOWN2,WHITE,SPACE3]
    ENTER BET, HORSE[BLACK]";B,H
180 B$=STR$(B):IF B<1 OR B>M THEN 140
190 PRINT"[CLEAR] THEY'RE OFF![SPACE2]
    YOU BET $";MID$(B$,2);" ON HORSE";
    H;"[LEFT].[DOWN]"
200 FOR X=1 TO 6:PRINT X;TAB(P(X));"
    [SHFT ^]/[DOWN]":NEXT
210 FOR T=1 TO 6:POKE 646,13+T
    :X=INT(RND(1)*OD(T)+1)
    :IF X=1 THEN P(T)=P(T)+1
220 PRINT"[HOME]";:FOR X=1 TO T
    :PRINT"[DOWN2]";:NEXT
230 PRINT TAB(P(T)-1);" [LEFT]";
    TAB(P(T));"[SHFT ^]"
240 IF P(T)>37 THEN W=T:POKE 646,0
    :GOTO 260
250 NEXT:GOTO 210
260 IF H<>W THEN B=-B:M=M+B
    :M$="YOU LOST":IF M<1 THEN 290
270 IF H=W THEN M$="YOU WON!"
    :M=M+B*OD(T)
280 PRINT TAB(15);"[DOWN7]";M$
    :FOR X=1 TO 2000:NEXT:RESTORE
    :GOTO 120
290 PRINT"[DOWN]YOU'RE BROKE!":END
```

64 Valley of Death: Use a joystick in port 2. Your goal is to get through the realistic Valley of Death without hitting the side walls. 'Tain't easy, what with all them human bones about!
Marc-Andre Delalay
St-Eustache, Quebec
Canada

```
10 PRINT"[CLEAR,WHITE]64 VALLEY OF
   DEATH[DOWN]BY MARC-ANDRE DELALAY"
15 POKE 53280,6:POKE 53281,0
20 DATA 000,195,000,003,255,192,015,
   255
30 DATA 240,063,255,252,063,255,252,
   063
40 DATA 255,252,063,255,252,015,255,
   240
50 DATA 015,195,240,015,195,240,003,
   000
60 DATA 192,003,000,192,000,195,000,
   000
70 DATA 195,000,000,255,000,000,255,
   000
80 DATA 000,060,000,000,060,000
90 FOR J=896 TO 948:READ K:POKE J,K
   :NEXT
100 FOR J=1 TO 800:NEXT:V=53248:D=10
    :G$="I[SPACE9]I":TI$="000000"
110 POKE 2040,14:POKE V,140
    :POKE V+1,75:POKE V+39,7
    :POKE V+21,1
120 IF PEEK(V+31)=1 THEN 120
130 LET A=INT(RND(1)*3-1):D=D+A
140 IF D<5 THEN D=D+1
150 IF D>15 THEN D=D-1
160 PRINT TAB(D);G$:IF
    TI$="000040"THEN 220
170 R=PEEK(56320)
180 H=SGN(R AND 4)-SGN(R AND 8)
190 POKE V,PEEK(V)+H
200 IF PEEK(V+31)=0 THEN 130
210 PRINT"[CLEAR]YOU HAVE CRASHED!!"
    :END
220 PRINT"[CLEAR]YOU HAVE SUCCEEDED!"
```

128 Sketcher: This works like an Etch-A-Sketch®. Plug a joystick into port 2 and start drawing. The HOME key will clear the screen, while the "C" key will change the color of your pen.
Richard Bowser, Jr.
Saxonburg, PA

```
10 REM 128 SKETCHER BY RICHARD BOWSER
20 COLOR 0,1:COLOR 4,1:GRAPHIC 1,1
   :X=20:Y=20:C=2:WIDTH 2
   :REM SET POINTERS
30 DRAW 1,X,Y:COLOR 1,C:GET A$
40 IF A$="[HOME]" THEN 20
   :ELSE IF A$="C" THEN C=C+1
   :IF C>16 THEN C=2
50 REM MOVE TO NEXT POSITION AND DRAW,
   CHECK FOR A SCNCLR OR COLOR CHANGE
60 IF JOY(2)=1 THEN Y=Y-1
70 IF JOY(2)=2 THEN X=X+1:Y=Y-1
80 IF JOY(2)=3 THEN X=X+1
90 IF JOY(2)=4 THEN X=X+1:Y=Y+1
100 IF JOY(2)=5 THEN Y=Y+1
110 IF JOY(2)=6 THEN X=X-1:Y=Y+1
120 IF JOY(2)=7 THEN X=X-1
130 IF JOY(2)=8 THEN X=X-1:Y=Y-1
140 IF X<1 THEN X=1:ELSE IF X>319
    THEN X=319
150 IF Y<1 THEN Y=1:ELSE IF Y>199
    THEN Y=199:REM CHECK IF AT EDGES
    OF SCREEN
160 GOTO 30
```

IconTroller Mounting Tip: The Suncom IconTroller is a tiny joystick that mounts directly onto the keyboard; it's particularly useful whenever you're working with GEOS. With my computer, however, the IconTroller kept getting in my way when I used BASIC and other programs.

My solution was to remove the IconTroller and cut off the "wing" that mounts it to the keyboard. Then I peeled off one of the wing's strips of double-sided tape and applied it to the bottom of the IconTroller, which I then mounted on a 2½" × 4" piece of 3/4" thick marble (used for paperweights, nameplates, etc.) This lets me use it almost like a mouse, keeping one hand on the IconTroller and one hand free. I can also move it completely out of the way whenever I'm not using it.
Gary Noakes
Landover, MD

geoPublish: One problem I encountered with this useful program was the carryover of graphics and text from previous pages. It took me a while to figure out how to correct it, but here it is:

When creating a Master Page, you must remember that whatever is on the first Master Page will be carried over to all the subsequent pages. This is great for headers, footers and page numbers, but if you drop a graphic onto the first Master Page, or put a border around it, it will be carried over to the rest of the pages in the document.

Now I put headers, footers and page numbers on the Master Page, lay out my text boxes on the Layout Page, and drop all graphics objects on the Graphics Page.
Gary Cook
Prince George, B.C.
Canada

Help for Poor Spellers: The spell checker is a useful accessory found in most modern word processors. It checks the spelling of words you've inadvertently misspelled in your document.

But if you *know* you can't spell a certain word, the spell checker isn't so valuable. And if you encounter the word when you're in the midst of inspiration, you probably don't want to stop and check the dictionary right then.

If your word processor has a search and replace function, there's an easy way to solve the problem. Instead of using your best guess at the spelling, use the first two or three letters of the word, followed by a distinctive symbol such as an asterisk.

For example, if you aren't sure how to spell "exhilarated," use "ex*" instead. At the end of your work session, take a break and check your dictionary for the proper spelling of "exhilarated."

Now invoke the search and replace function to replace all occurrences of "ex*" with "exhilarated." The computer will zip happily through your text and make all the replacements. You can do the same for any number of words, and some word processors will let you make multiple corrections on one pass.

If you have more than one word with the same two-initial letters, either use the first three letters of the second word, or different symbols at the end of the search string. Note that with some word processors, you must use a space at the end of the replacement string, otherwise it will be merged with the following word.
Paul Follini
Amherst, Nova Scotia
Canada

High-tech Bookmarks: If you have a printer, you have no doubt torn off hundreds of 11-inch long perforated edge strips from the paper that you've run through it. Save some of those strips to use for bookmarks in magazines and other computer literature.

They don't cost anything, you can put many in one magazine, and you have a virtually endless supply.

Another miracle of modern computer technology!
Garret D. Wilson
Chelsea, OK

Use Tabs in Your Manuals: All of us have books on computers, be they hardware manuals, BASIC manuals, program manuals or whatever. Using the little colored tabs available for notebooks, I have gone through every manual I own and marked all chapters, indexes and important tables and appendixes. This greatly simplifies my finding what I'm looking for in the books.

Although it took some time to catch up with all my older books, each new manual is now tabbed before it hits the shelf. The time spent doing this has been returned many fold.
Gary Noakes
Landover, MD

Sliding Write-Protect Tab: I saw this one at the Chicagoland Commodore Computerfest. It's a little plastic tab that slides down the inside edge of your disk seam, where it can be moved back and forth to cover or uncover the write protect slot.

It's easy enough to make your own tabs out of semi-stiff plastic sign material like the "For Sale" signs sold in hardware stores and bookstores. The type to get is flexible and about as thick as four or five sheets of paper. Make a pattern as described below, then use an X-Acto® knife to score the plastic. Snap it on the scores to produce the tab. Trim the tab until you can easily fit it into the side seam on the back of your disk; it works with most of the disk brands on the market.

Pull the tab back and you can write to the disk. The tab even sticks out of the drive to warn you! Slide it in and the disk is protected.

Make the pattern by putting your pencil to a sheet of paper and following this path: Right 1½", down ⅜", left ⅜". Up ¼", left 1⅛", up ⅛" to the starting point.

You can get a pack of ten of these tabs, already made up, if you send $2.00 and a self-addressed stamped envelope to the user group that made mine: Milwaukee Area Commodore Enthusiasts, P.O. Box 26216, Milwaukee, WI 53226.
Louis F. Sander
Pittsburgh, PA

Sound Processing: In addition to making sound on its own, your computer can process and control external sound, replaying it through a speaker connected to the SID chip. The external audio signal should be connected to pin 5 of the audio/video DIN plug. Its playback volume will be controlled by the SID chip volume control in memory location 54296, and it can be filtered by the SID's built-in filters.

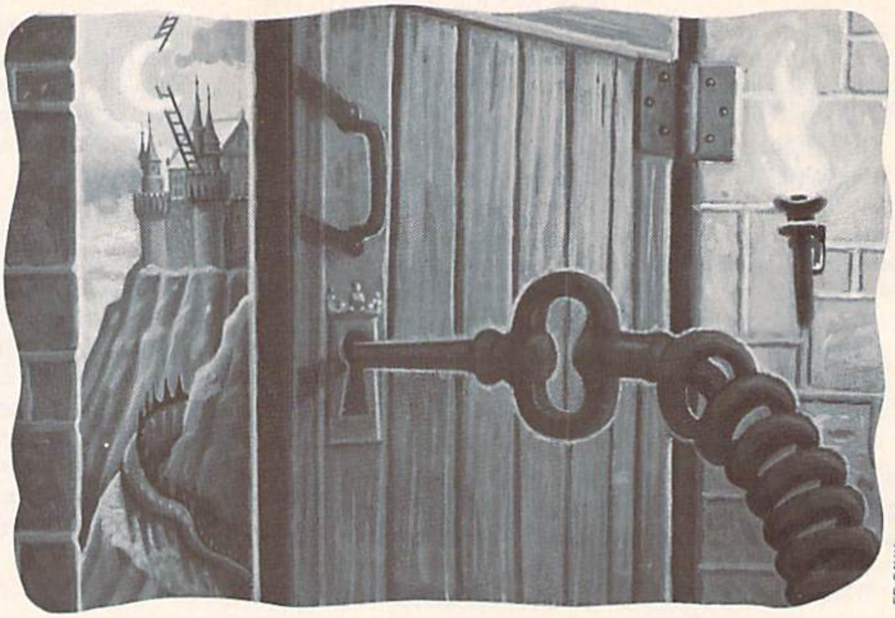
We've had reports of people playing their radios through their computers, controlling the volume by the SID volume control.

The external signal should not exceed 3 volts peak-to-peak.
Lucy S. Terrier
Alton, IL

by Robert W. Baker

Adventure-Link Debut

Explore the inner workings of the Q-Link telecommunications service with network pro Bob Baker.



Well, in case you missed it, there's a new service available on Q-Link. AdventureLink is where you can not only participate in the universe, but you can also help *create* it as well. The new area provides an opportunity for everyone to get involved in on-line adventure-style games, with levels for the beginner to the advanced adventurer or DungeonMaster.

Those who are just getting started in adventure games will find simple and intermediate level adventure games designed to provide thought-provoking excitement from start to finish. Various text files in the AdventureLink area will introduce you to the basic game play: how to make selections, map your progress and check your current health or score. There's even information on how an adventure can be linked together with one or more other adventures.

For the more advanced players, here's your opportunity to design your own dungeon or universe for everyone to try. There's complete information on how to design, create and submit a game of your own. In the near future, prizes will be offered for the best game designs and those submissions will be available for other subscribers to attempt to master. There's also a special message board where you can post questions or hints about any of the online games.

The adventure games found online are designed like a tree. You start at a given room or location, and your choice of action cause you to "branch" out into a series of different possibilities. If you take the right branch you may achieve fame and glory, while taking the wrong branch may bring you face to face with death or even worse. Each room or area can offer up to nine choices for possible actions to be selected by number or English command depending on the game. Watch out for dead ends, alternate paths and other less obvious attempts to get you lost or off the track.

Read the room descriptions carefully, since they may contain useful clues that could influence your selection. The last text line of each room will list the possible selections for moving to the next area or room. Also be sure to check the introductory file associated with each on-line game. The Briefings will provide the plot and objectives of the game, and may even provide attribute bonus points or special weapons and objects when you read them.

You can save or quit a game at any point during play. To save the current game, you simply enter SAVE as your command. You don't have to enter a filename to save the game, since you can only have one saved copy of each on-line game. That means that if there are ten games currently available, the maximum number of saved games is ten, one per game. To load a previously-saved game, enter the game as usual and then enter LOAD as your first command. You'll be transported back to the area you were in when you last saved the game. When you want to quit a game, simply press F5 and follow the directions. Just remember to save your game first if you think you'll want to continue playing it later.

As you journey through a game, you can always check your health and score at any time by typing STATUS or SCORE and pressing RETURN. This will give you an idea of how you're doing. Be sure to keep an eye on your health; if it reaches zero you'll be dead and the game will be over. Certain actions within each game can restore your health and give you a higher score, so be on the lookout for special potions!

If you'd rather design games for others to play, then check out the helpful text files provided in the AdventureLink area. You'll find complete information on how to design and map your game and how to provide the system with the required information to control your game. This unique aspect of AdventureLink allows you and other players to design any type of game you wish.

AdventureLink games are written as standard ASCII text files and uploaded to The Chart Room software library. From there, the people at Q-Link will reformat the file and test it out to make sure it plays right. Then, if it's one of the Top Ten picks for the month they'll put it live in the Glory Road where other subscribers can play it. The most important thing to remember is that *anything* is possible with AdventureLink. Let your imagination run wild. The more untraditional, the better. Your game can be long or short, complex or simple. The guidelines for choosing which games will go live on the system will be how interesting, wild and exciting the stories are.

Before you sit down to write your first game, be sure to check the information provided on how to create a game. Designing a game is not a simple matter, the entire game has to be charted or mapped before any of the text adventure can be written. The map should show each area or room that a player can enter, where the exits are, and what objects or other characters are in each area. Once this map is finished, you can start working on the text that ties it all together.

To map your game, the folks at Q-Link suggest one of two methods: flow-charting or form-charting. Most programmers are

already familiar with flow-charting, where a series of boxes are joined by lines that show where boxes connect with other boxes. Flowcharts are handy, since they let you view a wide section of the game at any one time, with all the various paths and side-trails easily and clearly visible. Unfortunately, a flowchart for a long game can be extremely big and may actually become unmanageable. You can make it a little easier on yourself by breaking the game into a series of small flowcharts that can be laid out to form one big chart.

The other mapping alternative discussed in the hints on designing games is the use of Form-charting. This mapping technique is somewhat easier, but you'll wind up using tons of paper for larger games. Form-charting involves using a separate sheet of paper for every room or area that a player can enter. Each page includes details on the room or area, including all the possible exits, objects and characters in that room. Each exit is labeled with the name or number of the area or room it leads to. You then stack the pages in order, and you can easily enter each separate page into your text file, one page at a time.

Using form-charting actually makes it a little easier to enter your game for Q-Link when it's done, but it may be a little harder to visualize the overall game design. Examples of both methods are included in the informational areas of AdventureLink. Either technique can be used, and you might even have another technique of your own. In any event, just be sure to think through your entire game before you start to create the file for Q-Link.

The actual file you create for Q-Link to define your game requires a format that must be strictly followed. This format makes it easier for the folks at Q-Link to make it ready to go live on the system for others to play. If you do not follow the rules, your game will probably just be discarded. So if you're going to spend the time to design a game for the system, be sure to follow the rules and do it right. If all is correct, you should get some sort of response from the people at Q-Link in a few days to let you know that they received the file and they're working on it.

One last thing about the online adventure games. Besides the game flow, game designers can also control the attributes of the characters in their game. The purpose of attributes is to let the player more closely affect the outcome of the game by having his attributes result from his actions. A player with high strength might more easily win a fight with a monster than a player with lower strength. In most role-playing and adventure games, attributes are expressed in terms like strength, wisdom, dexterity and agility.

In AdventureLink you can create your own set of attributes for your game. You're currently limited to a total of 16 attributes that can range in value from +/− 30,000, and they can increase or decrease during the game. As part of your game design, you'll have to consider what attributes to use and how they're initialized and used during the game. Also think about how and when or where the attributes should be changed during the game. Some attributes can even be set as permanent if so desired.

That covers most of the early information available on AdventureLink. I'm sure more will be coming in future months as we all try it out. While playing the online games, always remember to have fun! Each story is different, and in fact even the same game will not produce the same results when you take different courses of action in a story. Don't be afraid to make wild or even bizarre choices, the results may be hilarious and you can always start over.

Several months back I gave some details on helpful information from Tymnet and Telenet. Well, Bb Stacker mentioned how to get even more information from your local Tymnet node. Using any standard telecommunications package, contact your local Tymnet node and establish connection. The first prompt is for a terminal identifier, which is generally the letter "A." Then, if you respond with "INFORMATION" to the next Log-On input prompt you'll receive a wealth of information about Tymnet at no cost.

TerryC28 also points out that you should *never* use GEOS-formatted disks for downloading files from Q-Link. All you'll get is garbage if you try to use the program or text files. Always be sure to use a standard, *normally*-formatted diskette for your downloads from the system.

If you have any helpful hints or suggestions about Q-Link or ideas or suggestions for future columns, be sure to let me know. Your input and comments are always appreciated. You can reach me via E-mail to RBAKER almost daily. To those still attempting to send online messages while I'm online, I'm generally pretty busy while online and may not be able to respond right away. E-mail is always preferred. ■

Continued from page 18

of torpedoes and missiles. "Evasion and Escape" is a complete guide to dodging torpedoes.

Part Three is a reference manual containing illustrations and descriptions of all ships and weapons encountered in the game.

Use of sonar is perhaps the most important feature of the game. You can check the depth of the sea's surface duct and thermal layer, and then position your towed array accordingly to make it more difficult for enemy subs to detect you while making it easier for you to detect them. Once a sonar contact is made, the enemy ships' acoustic signature can be checked against a list of signatures to increase the accuracy of your sonar reading. There is also a screen that will allow you to compare the relative efficiency of your sonar versus the enemy.

The depth of detail (no pun intended) incorporated in the design of *Red Storm Rising* gives this MicroProse sub warfare action from Tom Clancy's novel a broad range of real-time game environments that will intrigue the beginner and satisfy the most demanding war gamer. ■

To help you get started here are some tips from our in-house *Red Storm Rising* expert, Greg Givler:

- Scenarios during the war are basically the same as the scenarios that you can choose to play. If when playing the war you have difficulty with one of the missions (mine is the wolfpack scenario), take some time to practice the scenario in a non-wartime setting.
- Save the game between each successful mission.
- It is best to reduce speed as soon as you enter a scenario; this gives you the best chance of hearing the enemy without being heard.
- When in the campaign map mode, you should try, whenever possible, to get in front of the target task force. This puts you in the best position for attack.
- Be patient—you are better at stealth than the enemy, use this advantage; it is a big one. When you know where they are and they don't know where you are, you can't get hurt.
- Last of all (and most importantly), *read the manual.* It is one of the best manuals that I have read for a war game. It has helped me numerous times to figure exactly what the computer is doing. It will also give you an idea as to how the enemy may react in a given situation.

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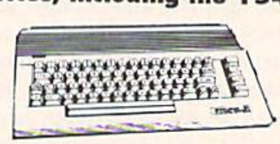
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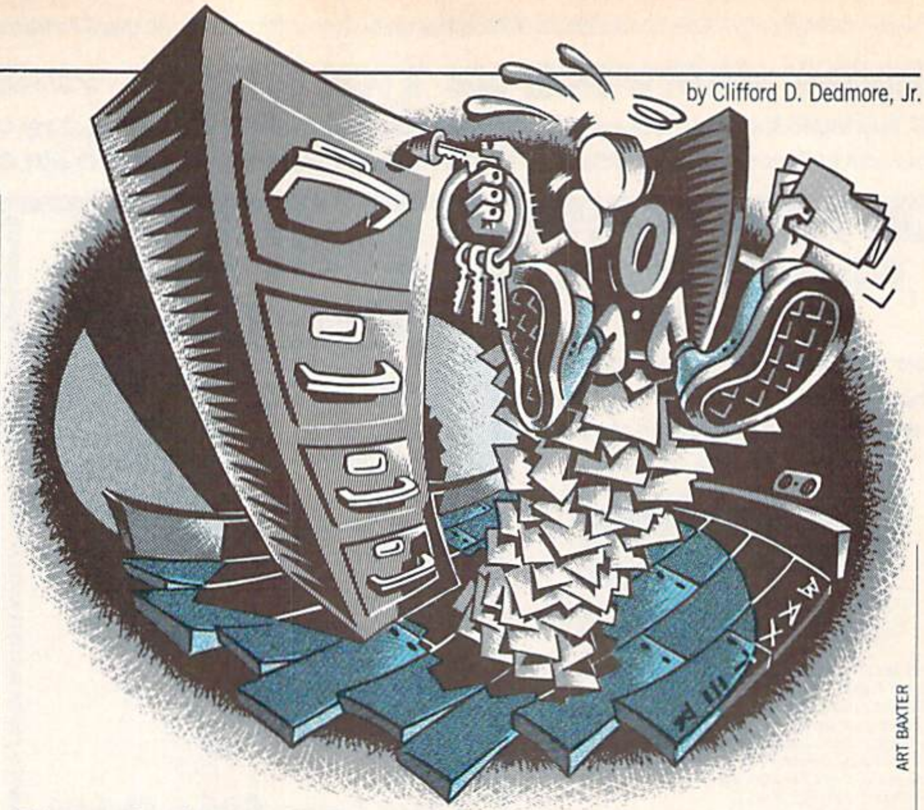
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22292 N. Pepper Rd.
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by Clifford D. Dedmore, Jr.

BAM Organizer

for the Commodore 64



BAM Organizer is a utility program that will take care of all your directory maintenance chores. It will allow you to Delete, Rename, Lock and Unlock any file or combination of files.

This program will even customize your directories by allowing you to change the order in which the filenames appear in your directory listings. You may alphabetize it or simply move a few around to suit your needs.

Have you ever seen those horizontal lines within some directory listings that seem to group the listing into different sections? With BAM Organizer you have the option of inserting your own lines (Bars) wherever you please.

One useful feature of this program is its ability to Un-delete (or recover) a scratched file.

NOTE: Only a 1541 disk drive (or equivalent) can be used. A 1571 can be used if it is in the 1541 mode of operation. Also, BAM Organizer should not be used on any diskettes containing Random Access files, since all the file data will be lost during the validation process.

When you run the program, you will be prompted to insert the diskette that you wish to work on in drive number 8. The program will then read the entire directory into memory for you to manipulate. Since the 1541 disk drive is capable of storing as many as 144 files on a single side of a diskette, the program divides the directory into four pages of 36 files each. To view a certain page simply press one of the function keys. Each function key represents a different page. If the page selected is empty of any entries, the page will not be shown.

After the directory has been loaded, you will notice that the menu does not show all of the commands. To view the rest of the commands just press the left arrow (←) key. It is not necessary to be able to see a command to use it. You just need to know which keys to press.

It is possible that a "D" or an "L" may precede a filename when displayed by BAM Organizer. The "D" means that this file has been deleted and will not be shown on a normal directory listing. The "L" means that this particular file is locked. A locked file cannot be deleted by the use of the OPEN15,8,15,"S0:FILENAME" command. To be able to delete it you must first unlock it. Once you choose a command, such as Lock, a selector bar will appear on the screen and a different menu will appear. Whichever filename is covered by the selector bar is the file that you are presently working with. Use the cursor keys to move the bar up, down, left or right.

To lock some files, select the Lock command. Move the selector bar over the files you wish to lock, one at time, and press "T" to toggle the greater than (>) symbol on or off. If it is on, you have chosen that file to be locked. Once you have marked all the files you wish to lock, simply press "D" which means Do it! All the files you have selected will then be locked. If you decide after toggling many files that you really didn't want to lock any at all then just press the left arrow key. That will take you back to the main menu and unselect all of the files you selected. The left arrow key will let you escape any mode except the Alphabetize mode.

DELETE: This mode will allow you to delete one or more files. If a file that is chosen to be Deleted is Locked, the program will not Delete it.

UNDELETE: This mode will allow you to recover a Deleted file. There are a few problems to watch for when using this command. When you delete a file from a disk the file is not actually removed. The directory is told to free all of the space that was used by that program. So the next program saved will probably be saved right on top of the one deleted. That will, of course, cause problems if you wish to recover the old program. You should Undelete the file as soon as you made the mistake of deleting it. Then you will be able to recover the whole file. To Undelete a file do the following:

1. Use BAM Organizer to Undelete it.
2. Make sure that the file is still in its original state. If it is, then everything is okay. (Go to step 5.) If it isn't then proceed to step 3. If you don't want to keep it then go to step 4.
3. Use a file copier to transfer the file to a different disk.
4. Run BAM Organizer again and delete that file again. That corrupt file *must* remain deleted on the first diskette. *Do not* use the regular Scratch command to re-delete that file. It will *not* work correctly. Only BAM Organizer will be able to do it correctly.
5. Stop.

UNLOCK/LOCK: These will allow you to lock and unlock files.

MOVE: Once you select this mode all you need to do is toggle the file that you wish to move and then move the selector bar to the position you want to place it and press "T" again. The file will be inserted into that new position, and all of the other files will re-adjust to make room.

ALPHABETIZE: Once selected, this option will immediately alphabetize the entire directory.

RENAME: When you toggle a filename

in this option, you will be prompted to enter the new filename.

BAR: To insert a Bar in your directory just select Bar in the first menu and move the selector bar to the position that you want the Bar placed and press "B." You may insert as many Bars as you want.

DONE: Once you have made all of the changes that you want made, you will need to write this new Directory back onto the diskette. *It is mandatory that the same disk that was in the drive when the directory was read is still in the drive when you select this option.* Once the directory is rewritten, the disk will go through the Validation process to ensure that the disk is in order.

EXIT: Selecting this option will end the program without saving any changes to the diskette.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

BAM Organizer

```
10 H$=H$+"RESET COMPUTER!!ABCDEFGHIJK
   "'CELG
12 DATA 162,4,32,198,255,160,,32,207,
   255,153'BLQG
15 DATA 229,159,200,192,27,208,245,32,
   204,255,96'BPWK
17 FOR K=49152 TO K+21:READ A
   :POKE K,A'GPKL
20 NEXT'BAEX
23 DATA UNLOCK,LOCK,DELETE,MOVE,
   WORKING," REWRITE BAM",UNDELETE,
   BAR,RENAME'BCCT
25 PRINT"[CLEAR]"CHR$(142)CHR$(8)
   :POKE 53281,0:PO=53280:POKE PO,0
   :FOR K=1 TO 32'JJQQ
30 NL$=CHR$(0):EF$=EF$+NL$:NEXT
   :PS=1'GVEH
35 FOR K=1 TO 9:READ PK$(K):NEXT
   :DL$(0)="":DL$(1)="[LEFT,GREEN]
   D"'HARO
40 BO$(0)="[RED]":BO$(1)="[RVS,
   L. BLUE]":LK$(0)=" "
   :LK$(1)="[GREEN]L":CH$(0)=" "
   :CH$(1)="[WHITE]>"'GQBO
45 DIM VT$(25),FL$(144),LK(144),
   D(144),CH(144),F(15),L(15)
   :IS=1'CFTR
50 VT$(1)="[HOME]":FOR K=1 TO 24
   :VT$(K+1)=VT$(K)+"[DOWN]":NEXT'IBAM
55 L$="[HOME,BLUE,SHFT U,SHFT C17,
   CMDR R,SHFT C20,SHFT I,SHFT B]
   "'BCON
56 L$=L$+"[SPACE2,L. BLUE]
   BAM ORGANIZER[SPACE2,BLUE,SHFT B,
   L. BLUE]BY:"'CENQ
60 L$=L$+" CLIFFORD DEDMORE[BLUE,
   SHFT B,CMDR Q,SHFT C7,CMDR R,
   SHFT C9,CMDR E,SHFT C5,CMDR R,
   SHFT C14,CMDR W]"'CEYO
65 L$=L$+"[SHFT B,L. BLUE]PAGE
   :[SPACE2,BLUE,SHFT B]"'CEYN
70 M$(1)="[L. BLUE]F-1[BLUE,SHFT B,UP,
   LEFT,CMDR R,DOWN,L. BLUE]F-3[BLUE,
```

```
   SHFT B,UP,LEFT,CMDR R,DOWN,L. BLUE]
   F-5[BLUE,SHFT B,UP,LEFT,CMDR R,
   DOWN,L. BLUE]F-7[BLUE,SHFT B,
   L. BLUE] [RVS]A[RVOFF]LPHABETIZE
   [SPACE2,BLUE,SHFT B]"'BFKY
75 M$(1)=M$(1)+"[CMDR Q,SHFT C4,
   CMDR R,SHFT C2,CMDR E,SHFT C3,
   SHFT +,SHFT C3,CMDR E,SHFT C2,
   CMDR R,CMDR E,SHFT C3,CMDR E,
   SHFT C3,CMDR R,SHFT C4,CMDR R,
   SHFT C5,CMDR W]"'CKTQ
76 M$(1)=M$(1)+"[SHFT B,L. BLUE,RVS]L
   [RVOFF]OCK[BLUE,SHFT B,L. BLUE,RVS]
   U[RVOFF]NLOCK"'CKBT
80 M$(1)=M$(1)+"[BLUE,SHFT B,L. BLUE,
   RVS]D[RVOFF]EL[DOWN,BLUE,SHFT C,
   L. BLUE,LEFT,UP]ETE[BLUE,SHFT B,
   DOWN,LEFT,CMDR E,UP,L. BLUE]U[RVS]
   N[RVOFF]D[DOWN,BLUE,SHFT C,L. BLUE,
   LEFT,UP]ELETE"'CKOX
84 M$(1)=M$(1)+"[BLUE,SHFT B,L. BLUE]
   D[RVS]O[RVOFF]NE[BLUE,SHFT B,
   L. BLUE]E[RVS]X[RVOFF]IT![BLUE,
   SHFT B]"'CKPS
85 M$(1)=M$(1)+"[CMDR Z,SHFT C4,
   CMDR E,SHFT C6,CMDR E,SHFT C3,
   RIGHT,SHFT C2,RIGHT,SHFT C3,RIGHT,
   SHFT C4,CMDR E,SHFT C4,CMDR E,
   SHFT C5,CMDR X]"'CKLP
90 VN$="[RVS]B[RVOFF]AR[BLUE,SHFT B,
   UP,LEFT,SHFT +,DOWN2,LEFT,CMDR E,
   UP,L. BLUE,RVS]R[RVOFF]E[BLUE,UP,
   SHFT C,LEFT,DOWN2,SHFT C,UP,LEFT,
   L. BLUE]NAME[BLUE,SHFT B,UP,LEFT,
   CMDR R,DOWN2,LEFT,CMDR E,UP,
   L. BLUE,RVS]M[RVOFF]OVE"'BDNC
95 M$(2)=LEFT$(M$(1),117)+VN$+RIGHT$
   (M$(1),61)'FEAT
100 N$="[SPACE15,SHFT B,L. BLUE,RVS,
    BACK ARROW,RVOFF,SPACE2]
    CANCEL MODE[BLUE,SHFT B,CMDR Q,
    SHFT C7,CMDR E,CMDR R,SHFT C14]
    "'BCMW
105 N$=N$+"[SHFT +,SHFT C7,CMDR R,
    SHFT C6,CMDR W,SHFT B,L. BLUE,RVS]
    T[RVOFF] TOGGLE[BLUE,SHFT B,
    L. BLUE] [RVS]A[RVOFF]
     TOGGLE ALL [BLUE,SHFT B,L. BLUE]
     [RVS]B[RVOFF] BAR [BLUE,SHFT B]
    "'CEOD
110 N$=N$+"[L. BLUE,RVS]D[RVOFF]O IT!
    [BLUE,SHFT B,CMDR Z,SHFT C8,
    CMDR E,SHFT C14,CMDR E,SHFT C7,
    CMDR E,SHFT C6,CMDR X]"'CELH
115 FOR K=1 TO 11:C1$=C1$+NL$
    :NEXT'GPTH
120 DA$="[SHFT C16]"+C1$+CHR$(131)
    +CHR$(18)+CHR$(1)'ISGS
125 G$="[SPACE15]":GOTO 145'CGOG
130 IF T=0 THEN CLOSE 4:CL=1
    :RETURN'GIAD
135 PRINT#15,"U1:";4;0;T;S:GOSUB 730
    :GET#4,T$,S$'DYOK
140 GOSUB 730:T=ASC(T$+NL$)
    :S=ASC(S$+NL$):RETURN'IWPJ
145 PRINT L$M$(1):PRINT VT$(15)"
    [WHITE] INSERT DISK TO BE
    ORGANIZED IN DRIVE 8"'CPQS
150 PRINT"[DOWN,SPACE6]
    AND PRESS <SPACE> WHEN READY"'BANI
155 GOSUB 845:IF A$<>" "THEN 155'FJEK
160 PRINT"[DOWN3,SPACE9]
    NOW LOADING DIRECTORY":NL$=NL$
    :T=18:S=0'EOBO
165 OPEN 15,8,15:OPEN 4,8,4,"#"
    :GOSUB 130:GOSUB 130'EWJM
170 BF=BF+1:IF BF=9 THEN GOSUB 130
    :BF=1:IF CL THEN POKE PO,0
    :GOTO 205'LCPP
175 PRINT#15,"B-P:";4;32*(BF-1)+2
    :GOSUB 730'FSLO
180 GET#4,A$,C$,D$:GOSUB 730
    :IF A$=""AND C$=""AND D$=""THEN
    170'JANN
185 P1=P1+1+255*(P1=255):POKE PO,P1
    :IF D$=""THEN D$=NL$'KECV
190 FL=FL+1:IF ASC(A$+NL$)>191 THEN
    LK(FL)=1'IXTO
195 IF A$=""THEN A$=NL$:D(FL)=1'FOWP
200 SYS 49152:GOSUB 730
    :FL$(FL)=H$+A$+C$+D$:GOTO 170'HEEG
205 P=0:MP%=(FL-1)/36:GOSUB 210
    :GOTO 245'GVIJ
210 FOR K=24 TO 7 STEP-1:POKE 781,K
    :SYS 59903:NEXT:FOR K=0 TO 1'LWJI
215 PRINT VT$(4)"[RIGHT6,L. BLUE]
    "P+1VT$(8);:FOR J=1 TO 18'FUFK
220 FI=P*36+K*18+J:IF K THEN PRINT
    SPC(19)"[BLUE,SHFT B]";'JPXI
225 PRINT LK$(LK(FI))DL$(D(FI))CH$(CH
    (FI))"[RED]"LEFT$(FL$(FI),16);
    'CUWO
230 IF J=18 THEN PRINT"[UP]"
    :GOTO 240'FHBE
235 PRINT'BACE
240 NEXT:NEXT:RETURN'DCGC
245 GOSUB 845:PK=-(A$="U")-2*(A$="L")
    -3*(A$="D")-4*(A$="M")-5*(A$="A")
    'QFKX
250 PK=PK-6*(A$="O")-7*(A$="N")-8*
    (A$="B")-9*(A$="R")'NYVP
255 IF PK THEN 305'CFAI
260 IF A$="X"THEN PRINT"[CLEAR]"
    :CLOSE 15:END'GGAH
265 IF A$="[BACK ARROW]"THEN IS=3-IS
    :PRINT L$M$(IS):GOTO 245'HULQ
270 GOSUB 275:GOTO 245'CHLF
275 IF A$<>"[F1]"THEN IF A$<>"[F3]
    "THEN IF A$<>"[F5]"THEN IF A$<>"
    [F7]"THEN RETURN'RIBW
280 Q=P:P=0*(A$="[F1]")-(A$="[F3]
    ")-2*(A$="[F5]")-3*(A$="[F7]
    ")'MXFS
285 IF P=Q THEN BO=0:GOSUB 335:TU=1
    :RETURN'HOGQ
290 IF P>MP%THEN P=Q:GOTO 300'FKHK
295 IF P<>Q THEN TU=1:GOSUB 210'GJDQ
300 RETURN:GOTO 245'CEKX
```

```
305 PRINT L$N$;:GOSUB 310
    :GOTO 315'DNIG
310 PRINT VT$(4)"[RIGHT6,L. BLUE]
    "P+1G$VT$(4)SPC(16-LEN(PK$(PK))/2)
    "[L. BLUE]"PK$(PK):RETURN'HMUM
315 IF PK=5 THEN 570'DGEG
320 IF PK=6 THEN 640'DGDC
325 PS=1:LR=0:BO=1'DLMI
330 GOSUB 335:GOTO 350'CHFC
335 PRINT VT$(7+PS);:IF LR THEN PRINT
    SPC(20);'GQIM
340 FI=P*36+LR*18+PS:PRINT
    LK$(LK(FI))DL$(D(FI))CH$(CH(FI))
    BO$(BO);'GCMR
345 PRINT LEFT$(FL$(FI),16)"[RVOFF]";
    :RETURN'DOML
350 POKE 198,0:GOSUB 845'CJCE
355 IF A$<>"[UP]"THEN 380'EFOL
360 IF P=0 THEN IF LR=0 THEN IF PS=1
    THEN 350'JLBL
365 BO=0:GOSUB 335:PS=PS-1'ENBN
370 IF PS=0 THEN PS=18:PP=P+(LR=0)
    :LR=2-(LR+1):IF PP<P THEN P=PP
    :GOSUB 210'PLIX
375 BO=1:GOSUB 335:GOTO 350'DLXN
380 IF A$<>"[DOWN]"THEN 405'EFOI
385 IF P*36+LR*18+PS+1>FL THEN
    350'IPVS
390 BO=0:GOSUB 335:PS=PS+1'ENAL
395 IF PS=19 THEN PS=1:PP=P-(LR=1)
    :LR=2-(LR+1):IF PP>P THEN P=PP
    :GOSUB 210'PLKF
400 BO=1:GOSUB 335:GOTO 350'DLXC
405 IF A$<>"[RIGHT]"AND A$<>"[LEFT]
    "THEN 420'HHUJ
410 IF P*36+(2-(LR+1))*18+PS>FL THEN
    350'JURJ
415 BO=0:GOSUB 335:LR=2-(LR+1):BO=1
    :GOSUB 335:GOTO 350'IDMP
420 IF A$="[BACK ARROW]
    "THEN FOR K=1 TO FL:CH(K)=0:NEXT
    :PRINT L$M$(IS):GOTO 205'KCKM
425 IF A$="B"AND PK=8 THEN 775'FIXK
430 IF A$<>"T"THEN 495'EFQE
435 IF PK=9 THEN R$="":GOTO 790'FJQL
440 IF PK<>4 THEN 465'EGEG
445 IF MV=0 THEN MV=FI:GOTO 465'FLCM
450 IF MV=FI THEN MV=0:GOTO 465'FLCI
455 GOTO 470'BDKJ
460 MV=0:GOSUB 210:GOTO 330'DLFI
465 CH(FI)=2-(CH(FI)+1):GOSUB 335
    :GOTO 350'FYCR
470 IF FI=MV THEN MV=0:GOTO 465'FLCK
475 Z=PK:PK=5:GOSUB 310:CH(MV)=0
    :T1=D(MV):T=LK(MV):T$=FL$(MV)'HUSA
477 IF MV<FI THEN 485'DHIP
480 FOR K=MV TO FI+1 STEP-1
    :LK(K)=LK(K-1):FL$(K)=FL$(K-1)
    :D(K)=D(K-1)'MSNX
483 NEXT:GOTO 490'CEAK
485 FOR K=MV TO FI-2:LK(K)=LK(K+1)
    :FL$(K)=FL$(K+1):D(K)=D(K+1)
    :NEXT'LSMD
490 D(K)=T1:LK(K)=T:FL$(K)=T$:MV=0
```

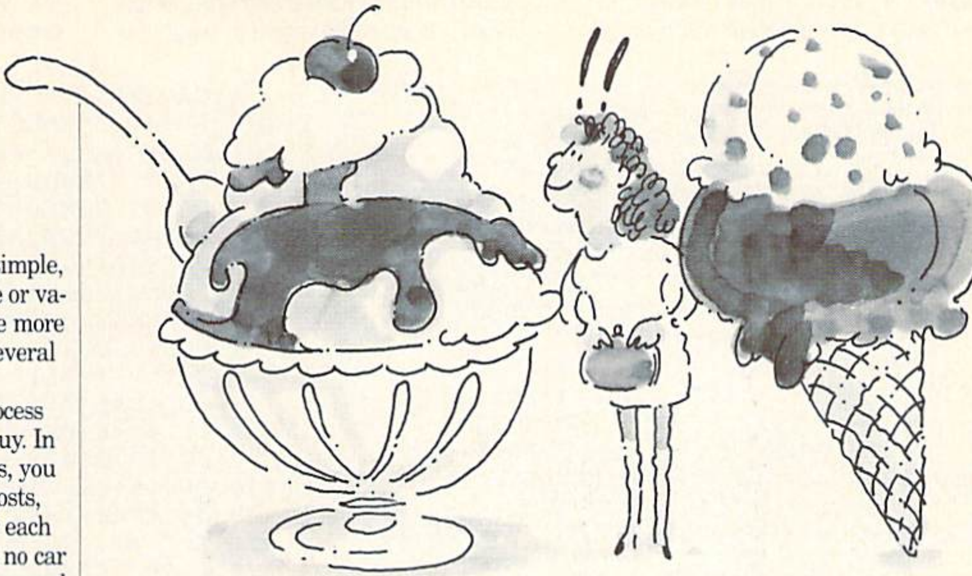
```
    :PK=Z:GOSUB 310:GOTO 460'HNBU
495 IF NOT(A$="A"AND PK<4)THEN
    505'GKDS
500 FOR Q=1 TO FL:CH(Q)=2-(CH(Q)+1)
    :NEXT:GOSUB 210:GOSUB 335
    :GOTO 350'KHNM
505 IF A$<>"D"OR PK=4 THEN 560'GIMK
510 Z=PK:PK=5:GOSUB 310:PK=Z
    :FOR K=FL TO 1 STEP-1:D=D(K)
    :L=LK(K)'LJOP
512 IF CH(K)=0 THEN 555'DJRF
515 IF PK=7 AND D THEN DL=130
    :GOSUB 785'GNIL
520 IF PK=3 AND L=0 AND D=0 THEN DL=0
    :GOSUB 785'JOOK
525 IF(PK=1 AND L)OR(PK=2 AND
    L=0)THEN 535'IQUO
530 GOTO 555'BDOD
535 IF D(K)THEN 555'CHBJ
540 LK(K)=-(PK=2):E$=FL$(K)
    :E1=ASC(MID$(E$,28,1))'HIVO
545 FL$(K)=LEFT$(E$,27)+CHR$(E1-64*
    (E1<133)+64*(E1>191))'KKWV
550 FL$(K)=FL$(K)+RIGHT$(E$,2)'DSYJ
555 NEXT:A$="[BACK ARROW]"
    :GOTO 420'DHOM
560 GOSUB 275:IF TU THEN PS=1:LR=0
    :BO=1:TU=0:GOSUB 335:GOTO 350'JEAR
565 GOTO 350'BDHL
570 T=0:S=1:BF=FL'DKVK
575 A$=FL$(INT((BF+S)/2)):K=S
    :J=BF'GWHU
580 IF FL$(K)<A$THEN K=K+1
    :GOTO 580'GPFO
585 IF FL$(J)>A$THEN J=J-1
    :GOTO 585'GPGT
590 IF K>J THEN 615'DFUL
595 IF K=J THEN 610'DFQQ
600 T$=FL$(K):FL$(K)=FL$(J):FL$(J)=T$
    :P=LK(K):LK(K)=LK(J):LK(J)=P'GFMQ
605 T1=D(K):D(K)=D(J):D(J)=T1'DWSM
610 K=K+1:J=J-1:IF K<=J THEN 580'INEJ
615 IF K>=BF THEN 625'EGFK
620 F(T)=K:L(T)=BF:T=T+1'EQMI
625 BF=J:IF S<BF THEN 575'EKFM
630 IF T=0 THEN 835'DFIG
635 T=T-1:S=F(T):BF=L(T):GOTO 575'FUPQ
640 GOSUB 770:PRINT SPC(11)"[UP2,RVS]
    ARE YOU SURE (Y/N)?"'DHDN
645 GOSUB 845'BDUK
650 IF A$<>"Y"AND A$<>"N"THEN 645'HHLL
655 IF A$="N"THEN PRINT L$M$(IS)
    :GOTO 205'FONQ
660 GOSUB 770:PRINT SPC(12)"[RVS,UP2]
    NOW REWRITING BAM":PK=5'ELOQ
665 GOSUB 310:T=18:S=0:OPEN 4,8,4,"#"
    :GOSUB 130'FVFS
670 PRINT#15,"B-P:";4;2'BHDK
675 CT=CT+1:IF CT<145 THEN 690'FOTS
680 GOSUB 770:PRINT SPC(11)"[RVS,UP2]
    NOW VALIDATING DISK"
    :PRINT#15,"V"'ELOT
685 GOSUB 730:CLOSE 4:CLOSE 15
    :PRINT"[CLEAR]FINISHED!":END'FKJV
690 IF EF THEN PRINT#4,EF$;
    :GOTO 700'EMXN
695 PRINT#4,RIGHT$(FL$(CT),
    3)LEFT$(FL$(CT),27)"CD";'DBFW
700 IF CT=FL THEN EF=1'EHWF
705 P1=P1+1+255*(P1=255):POKE PO,P1
    :IF CT/8<>INT(CT/8)THEN 675'NIUW
710 LS=S+3+17*(S>15):T=18
    :PRINT#15,"B-P:";4,0'HXGM
715 IF EF THEN PRINT#4,NL$CHR$(255);
    :GOSUB 730:GOTO 725'GVKP
720 PRINT#4,CHR$(T)CHR$(LS);
    :GOSUB 730'EOHI
725 PRINT#15,"U2:";4;0;18;S:GOSUB 730
    :S=LS:GOTO 675'EYHQ
730 INPUT#15,DS,DS$,TN,SN
    :IF DS=.THEN RETURN'FTJL
735 IF DS<>26 THEN 760'EHYN
740 PRINT VT$(11)SPC(10)"[RVS]
    REMOVE W/PROTECT TAB!"'CKBO
745 PRINT SPC(10)"[RVS,SPACE9]&
    [SPACE9]":PRINT SPC(13)"[RVS]
    PRESS <RETURN>"'EHJU
750 GET A$:IF A$<>CHR$(13)THEN
    750'GMHM
755 CT=0:CLOSE 4:GOTO 660'DJEO
760 PRINT"[CLEAR]DRIVE
    ERROR...PROGRAM ABORTED"
    :PRINT"[DOWN]"DS;DS$TN;SN'CMEU
765 CLOSE 4:CLOSE 15:END'DFFO
770 FOR K=1 TO 3:PRINT
    VT$(10+K)SPC(9)"[RVS,SPACE23]"
    :NEXT:RETURN'IQAT
775 IF FL=144 THEN 245'DITQ
780 FL=FL+1:MV=FL:LK(FL)=0:FL$(FL)=DA$
    :MP%=(FL-1)/36:GOTO 475'JTXA
785 D(K)=2-(D(K)+1):FL$(K)=LEFT$(FL$
    (K),27)+CHR$(DL)+RIGHT$(FL$(K),
    2)'JTBE
787 RETURN'BAQQ
790 PRINT"[BLUE]":GOSUB 770'CEDM
794 PRINT VT$(11)SPC(13)"[RVS]
    ENTER NEW TITLE"VT$(13)SPC(13)"
    [RVS,BACK ARROW]";'DVXY
795 GOSUB 845'BDUQ
800 IF A$="[BACK ARROW]"THEN 835'DFWF
805 A=ASC(A$):R=LEN(R$)
    :IF A>31 AND A<91 AND A<>34 AND
    R<16 THEN 840'OCTW
810 IF(A=20 OR A=13)AND R>0 THEN
    820'HNPK
815 GOTO 795'BDUJ
820 IF A=20 THEN R$=LEFT$(R$,R-1)
    :PRINT"[LEFT2,RVS,BACK ARROW]
    [LEFT]";:GOTO 795'ISVP
825 IF LEN(R$)<16 THEN R$=R$+CHR$(160)
    :GOTO 825'ITVS
830 FL$(FI)=R$+RIGHT$(FL$(FI),14)'DVSL
835 PRINT"[RVOFF]"L$M$(IS)
    :GOTO 205'CMIO
840 PRINT"[LEFT,RVS]"A$"[BACK ARROW]";
    :R$=R$+A$:GOTO 795'EOBM
845 GET A$:IF A$=""THEN 845'EIQP
850 RETURN'BAQH
```

END

by Keith Leithauser

Decision Maker

for the Commodore 64



Decisions, decisions! Some are simple, like whether to have chocolate or vanilla ice cream for dessert. Some are more complicated because they involve several factors to consider.

Consider the decision-making process involved in selecting which car to buy. In choosing between two (or more) cars, you must consider price, maintenance costs, gas mileage, comfort, even whether each car comes in the color you like. But no car has them all. How do you compare several cars, each of which has several different things you like?

Decision Maker helps you make decisions in which there are many unrelated factors to consider. It is something like the old concept of listing the pros ands cons of each choice, except that it also allows you to weigh the importance of each issue. It then carries out a mathematical computation that tells you which choice has the most of the best features.

When you run Decision Maker, it will ask you for a name for the decision you want to make. This is just to give the output a label. You can input something like "Which car should I buy?" or "Which job should I take?"

Next, the program asks you how many choices there are, and what their names are. You can give the choices any names you like. This is just to have a label to identify them as the program runs. I suggest you keep the names under 30 characters, because the screen display will be uncluttered later.

The program then asks you how many criteria there are for making the choice. It also asks you how many are cost criteria, as opposed to benefit criteria. A cost criterion is anything for which you want a low number. The price of something you might buy is one example. Another might be the time required to do something. For example, suppose you are considering two vacation spots that you might drive to this summer. If you do not like to drive, the driving time to each spot might be considered a cost criteria. A benefit criteria is anything for which you want a high number, such as gas mileage on a car.

The program will ask you for the name of each cost criterion and then each benefit criterion. Then it will display a list of these criteria and ask you which is the most important factor in making your decision. Input the number of the most important criteria and press ENTER. The program will then list each of the other criterion and ask you to rate important criteria. For example, if comfort of a car is the most important thing to you and the cost of the car is half as important as comfort, you would input 50 as the importance rating of cost. This is entirely a subjective evaluation on your part.

Next, the program will ask you to give the actual value for each of your choices for each of the criteria. If the criterion has an actual number, you can input this number. For example, for the cost criterion you could put in the actual price of the object. For driving time in the vacation example, you could input the number of hours of driving. Remember that you must use the same units of measure for each input for the same criterion. Do not put driving time in minutes for one vacation spot and hours for another. Also, you cannot input zero for any value. If the answer is zero, input any extremely small number, such as .001.

If the criterion does not have a numeric value, you can rate the choices with arbitrary subjective numbers. For example, you could rate the driving comfort of each car you are considering from one to ten. The most comfortable car would get ten. The second most comfortable car would not necessarily get a nine. If it was two thirds as comfortable as the most comfortable car, it would get a 6.6.

When giving subjective numbers, remember that in a cost criterion, you want to give a high number to an undesirable item. In a benefit criterion, you would want to give a high number to a desirable item. In the above example, you might rate the cars on discomfort, rather than comfort. You would list discomfort as a cost criterion instead of listing comfort as a benefit criterion. In this case, the most uncomfortable car would get a ten. A car that was half as uncomfortable would rate a five.

Some criteria might be yes/no criteria. In these cases, you would use a very high number to indicate yes and a very low number (but not zero) to indicate no, or vice versa. For example, in choosing between several jobs, one of them might require you to move to another state, which you might not want to do. You could make "must move" one of the cost criteria. You could give a one to a job that does not. Another way to do it would be to make "don't need to move" a benefit criterion. You would give a 1000 to a job that does not require you to move, and a one to a job that does.

When you have input the values for all the choices for each criterion, the program will rate all your choices and give you a list. The best choice is at the top of the list, the next best is second, and so on. You will also get a point rating for each choice. A choice that has 100 points is twice as good as a choice that has 50 points.

After you arrive at this list, the program will ask if you want a hard copy of the list. Then it will ask you if you want to run Decision Maker over. If you say yes, the program will ask if you want to repeat the same decision. If you say no the pro-

gram will start over from the beginning. If you say yes, the program will retain the name of the decision, the names of the choices, and the names and types of all criteria. It then allows you to input new importance ratings and values. This allows you to easily experiment with your decision.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Decision Maker

```
 10 POKE 53281,0:POKE 53280,0
    :PRINT CHR$(147);CHR$(14);
    :GOSUB 1840:PRINT'HIGI
 20 PRINT:S$="[SHFT P]RESENTING"
    :GOSUB 1680:PRINT:S$="[SHFT D]
    ECISION [SHFT M]AKER"
    :GOSUB 1680'GRJN
 30 PRINT:S$="BY":GOSUB 1680:PRINT
    :S$="[SHFT D]AVID [SHFT L]
    EITHAUSER":GOSUB 1680'GRKM
 40 PRINT:PRINT:PRINT:GOSUB 1700'EHFD
 50 PRINT CHR$(147):CLR'DGJE
 55 DIM CH$(20),C2$(20),E$(20),B$(20),
    V(20,50),VT(20),PC(50)'BCBQ
 60 CL=6'BDSD
 70 PRINT:GOSUB 1830'CFSF
 75 S$="[SHFT I]NPUT THE NAME OF THE
    DECISION YOU WANT":GOSUB 1680'CHDV
 80 S$="TO MAKE ([SHFT F]OR EXAMPLE,
    [SHFT W]HAT CAR TO BUY)"
    :GOSUB 1680'CHOR
 90 PRINT:GOSUB 1800'CFPH
100 GOSUB 1850:ND$=I$:IF ND$="" THEN
    100'FRGB
110 PRINT'BACV
120 GOSUB 1820'BEMX
130 PRINT "[SHFT H]OW MANY CHOICES
    ARE THERE?";:GOSUB 1850
    :NC=VAL(I$)'ENWL
140 IF NC<2 THEN GOSUB 1790
    :GOTO 130'FLRE
150 FOR X=1 TO NC'DEPC
160 PRINT "[SHFT N]AME OF CHOICE #";X;
    "?";:GOSUB 1850:CH$(X)=I$'DSCL
165 IF CH$(X)="" THEN 160'DJKJ
170 IF LEN(CH$(X))>CL THEN
    CL=LEN(CH$(X))'GUNK
180 NEXT X'BBRD
190 PRINT "[SHFT H]OW MANY CRITERIA
    FOR MAKING THE CHOICE"'BADP
200 PRINT "ARE THERE?";:GOSUB 1850
    :CR=VAL(I$)'ENLE
205 IF CR<2 THEN GOSUB 1790
    :GOTO 190'FLCG
210 PRINT CHR$(147);:GOSUB 1840
    :PRINT'EMNB
220 PRINT "[SPACE3,SHFT S]
    OME OF THE"CR"CRITERIA ARE
    PROBABLY"'BCRI
230 PRINT "WHAT WE CALL COST
    CRITERIA. [SHFT T]HIS MEANS"'BAYK
240 PRINT "ANYTHING THAT WE WANT TO
    MINIMIZE, SUCH"'BAUL
250 PRINT "AS EXPENSE, TIME REQUIRED
    TO DO"'BAPJ
260 PRINT "SOMETHING, ETC. [SHFT S]
    OME OF THE CRITERIA"'BAJM
270 PRINT "ARE WHAT WE CALL BENEFIT
    CRITERIA. [SHFT T]HIS"'BAPO
280 PRINT "MEANS ANYTHING WE WANT TO
    MAXIMIZE,"'BADO
290 PRINT "SUCH AS HOW MUCH WE GET
    PAID, COMFORT,"'BAIP
300 PRINT "HOW MUCH WE ENJOY
    SOMETHING, ETC."'BAQG
310 PRINT:GOSUB 1820:PRINT "[SHFT H]
    OW MANY OF THE CRITERIA ARE
    COST"'DGKK
320 PRINT "CRITERIA?";:GOSUB 1850
    :CC=VAL(I$):IF I$="" THEN 310'HTYK
330 IF CC<0 OR CC>CR THEN GOSUB 1790
    :GOTO 310'HPDH
340 CB=CR-CC'CGCD
350 IF CC=0 THEN 400'DGUF
360 FOR X=1 TO CC'DEEF
370 PRINT "[SHFT W]HAT IS THE NAME OF
    COST CRITERIA":PRINT "#";X;"?";
    :GOSUB 1850'DKMR
380 E$(X)=I$:IF E$(X)="" THEN 370'EQAK
390 NEXT X'BBRG
400 IF CB=0 THEN 450'DGYB
410 FOR X=1 TO CB'DEDB
420 PRINT "[SHFT W]HAT IS THE NAME OF
    BENEFIT CRITERIA"'BAXK
430 PRINT "#";X;"?";:GOSUB 1850
    :B$(X)=I$:IF B$(X)="" THEN
    420'GBWK
440 NEXT X'BBRC
450 PRINT CHR$(147);:GOSUB 1840'DLCH
455 S$="[SHFT Y]OUR CRITERIA FOR
    MAKING A CHOICE ARE:"'BCXT
460 GOSUB 1680:PRINT'CFVG
470 IF CC>0 THEN FOR X=1 TO CC
    :PRINT X") "E$(X):NEXT X'IQAO
480 IF CB>0 THEN FOR X=1 TO CB
    :PRINT X+CC") "B$(X):NEXT X'JSSQ
490 PRINT:GOSUB 1820:PRINT "[SHFT W]
    HICH OF THESE IS THE MOST
    IMPORTANT"'DGPU
500 PRINT "(INPUT NUMBER)?";
    :GOSUB 1850:X=VAL(I$)'EMUI
510 IF X<1 OR X>CR THEN GOSUB 1790
    :GOTO 490'HNVH
520 IF X<=CC THEN T$=E$(X)
    :GOTO 540'GONI
530 T$=B$(X-CC)'CJFF
540 PC(X)=100'BIBF
550 PRINT CHR$(147);:PRINT:PRINT
    :GOSUB 1840:S$="[SHFT T]
    HE CRITERIA":GOSUB 1680'HVDQ
560 GOSUB 1830:S$=T$:GOSUB 1680
    :GOSUB 1840'ETSL
570 S$="HAS NOW BEEN ASSIGNED AN
    IMPORTANCE":GOSUB 1680'CHDS
580 S$="RATING OF 100. [SHFT Y]
    OU MUST NOW RATE THE"
    :GOSUB 1680'CHFT
590 S$="OTHER CRITERIA ON A SCALE OF
    1 TO 100":GOSUB 1680'CHPT
```

```
600 S$="COMPARED TO":GOSUB 1680
    :GOSUB 1830:S$=T$:GOSUB 1680'FWSK
610 GOSUB 1840:S$="[SHFT F]OR EXAMPLE,
     IF":GOSUB 1680'DMFJ
620 IF X<>1 AND CC THEN T2$=E$(1)
    :GOTO 670'HQAJ
630 IF X<>1 AND CC=0 THEN T2$=B$(1)
    :GOTO 670'IRRL
640 IF X=1 AND CC>1 THEN T2$=E$(2)
    :GOTO 670'HRSM
650 IF X=1 AND CC THEN T2$=B$(1)
    :GOTO 670'GQTM
660 T2$=B$(2)'BISI
670 GOSUB 1830:S$=T2$:GOSUB 1680
    :GOSUB 1840'EUSN
680 S$="IS HALF AS IMPORTANT AS"
    :GOSUB 1680:GOSUB 1830:S$=T$
    :GOSUB 1680'FWRV
690 GOSUB 1840:S$="THEN THE RATING OF"
    :GOSUB 1680'DMSS
700 GOSUB 1830:S$=T2$:GOSUB 1680
    :GOSUB 1840:S$="IS 50."
    :GOSUB 1680'GDUL
710 GOSUB 1700'BEJD
720 PRINT CHR$(147);:GOSUB 1820
    :S$="[SHFT C]OMPARED TO"
    :GOSUB 1680:S$=T$'GYIP
730 GOSUB 1680:S$="WHICH HAS A VALUE
    OF 100,":GOSUB 1680'DMDO
740 S$="HOW IMPORTANT IS"
    :GOSUB 1680'CHJM
750 GOSUB 1820:PRINT:IF CC=0 THEN
    810'FMBL
760 FOR X=1 TO CC'DEEJ
770 IF PC(X)>0 THEN 800'DJFL
780 PRINT E$(X);"?";:GOSUB 1850
    :PC(X)=VAL(I$)'EWKQ
790 IF PC(X)<1 OR PC(X)>100 THEN
    GOSUB 1790:GOTO 780'HWNT
800 NEXT X'BBRC
810 IF CB=0 THEN 870'DGFG
820 FOR X=1 TO CB'DEDG
830 IF PC(CC+X)>0 THEN 860'ELDK
840 PRINT B$(X);"?";:GOSUB 1850
    :PC(CC+X)=VAL(I$)'FYFO
850 IF PC(CC+X)<1 OR PC(CC+X)>100
    THEN GOSUB 1790:GOTO 840'JBGS
860 NEXT X'BBRI
870 PRINT CHR$(147):PRINT
    :GOSUB 1840'ELEN
880 PRINT "[SPACE3,SHFT N]
    OW YOU MUST INPUT THE VALUES
    OF"'BAXU
890 PRINT "EACH CRITERIA FOR EACH
    CHOICE. [SHFT I]F THERE"'BADW
900 PRINT "IS AN ACTUAL VALUE,
     SUCH AS DOLLARS OR"'BAIN
910 PRINT "HOURS, YOU MAY INPUT THIS
    VALUE."'BADN
920 PRINT "[SHFT I]F THERE IS NO
    NUMERICAL VALUE, YOU MAY"'BAIQ
930 PRINT "ASSIGN ARBITRARY VALUES.
    [SHFT F]OR EXAMPLE,"'BAAR
940 PRINT "IF YOU LIKE ONE COLOR
    TWICE AS MUCH AS"'BADR
950 PRINT "ANOTHER, YOU COULD INPUT A
    VALUE OF 10"'BAPS
960 PRINT "FOR THE COLOR YOU LIKE
    MOST AND 5 FOR"'BAFT
970 PRINT "THE ONE YOU LIKE
    LESS."'BAQQ
980 GOSUB 1700'BEJM
990 FOR X=1 TO CR'DETO
1000 PRINT CHR$(147);:GOSUB 1840
     :S$="[SHFT F]OR THE CRITERIA:"
     :GOSUB 1680'FTGF
1010 IF X<=CC THEN S$=E$(X)
     :GOTO 1030'GPEB
1020 S$=B$(X-CC)+","'DJNY
1030 GOSUB 1830:GOSUB 1680'CJNX
1040 GOSUB 1820:S$="WHAT IS THE VALUE
     FOR":GOSUB 1680:PRINT'ENBH
1050 FOR Y=1 TO NC'DEQA
1060 VT(Y)=0:PRINT CH$(Y);"?";
     :GOSUB 1850:VT(Y)=VAL(I$)'FFLJ
1070 IF VT(Y)=0 THEN GOSUB 1790
     :GOTO 1060'FPEG
1080 NEXT Y'BBSB
1090 IF X>CC THEN 1180'DHNF
1100 VM=1E30'BGUV
1110 FOR Y=1 TO NC'DEQW
1120 IF VT(Y)<VM THEN VM=VT(Y)'EOHC
1130 NEXT Y'BBSW
1140 FOR Y=1 TO NC'DEQA
1150 V(Y,X)=VM/VT(Y)'CNRD
1160 NEXT Y'BBSA
1170 GOTO 1250'BEFC
1180 VM=0'BDHD
1190 FOR Y=1 TO NC'DEQF
1200 IF VT(Y)>VM THEN VM=VT(Y)'EOFB
1210 NEXT Y'BBSV
1220 FOR Y=1 TO NC'DEQY
1230 V(Y,X)=VT(Y)/VM'CNRC
1240 NEXT Y'BBSY
1250 NEXT X'BBRA
1260 PRINT CHR$(147);:VM=0'DKUF
1270 FOR X=1 TO NC'DEPE
1280 VT(X)=0'BGCF
1290 FOR Y=1 TO CR'DEUG
1300 VT(X)=VT(X)+PC(Y)*V(X,Y)'DVKD
1310 NEXT Y'BBSW
1320 IF VT(X)>VM THEN VM=VT(X)'EODE
1330 NEXT X'BBRY
1340 FOR X=1 TO NC:C2$(X)=CH$(X)
     :VT(X)=100*VT(X)/VM:NEXT X'IKTN
1350 FOR X=NC TO 1 STEP -1'FFRF
1360 Z=0'BCJD
1370 FOR Y=1 TO X'DDJF
1380 IF VT(Y)=>VT(Y+1) THEN 1400'FPUK
1390 Z=VT(Y):VT(Y)=VT(Y+1):VT(Y+1)=Z
     :S$=C2$(Y)'GKIR
1395 C2$(Y)=C2$(Y+1):C2$(Y+1)=S$
     :Z=-1'GBGT
1400 NEXT Y'BBSW
1410 IF Z=0 THEN 1430'DGDB
1420 NEXT X'BBRY
1430 GOSUB 1840:S$="[SHFT F]
     OR THE DECISION":GOSUB 1680
     :GOSUB 1830'ERBK
```

```
1440 S$=ND$:GOSUB 1680:GOSUB 1840'DPJG
1450 S$="THE FOLLOWING IS A LIST OF
     YOUR":GOSUB 1680'CHNN
1460 S$="CHOICES, AND THEIR POINT
     VALUES:":GOSUB 1680'CHDO
1470 PRINT:PRINT "[SHFT C]HOICE";
     TAB(CL+2);"[SHFT P]OINTS"'EHWM
1480 FOR X=1 TO NC'DEPH
1490 PRINT C2$(X);TAB(CL+1);
     INT(VT(X))'ETXM
1500 NEXT X'BBRX
1510 PRINT:S$="[SHFT D]
     O YOU WANT HARD COPY":GOSUB 1730
     :IF YN=0 THEN 1620'GQDM
1520 OPEN 1,4:PRINT#1,"[SHFT F]
     OR THE DECISION":PRINT#1,ND$'DMOJ
1530 PRINT#1,"THE FOLLOWING IS A LIST
     OF YOUR"'BCRK
1540 PRINT#1,"CHOICES, AND THEIR
     POINT VALUES:"'BCHL
1550 PRINT#1," ":PRINT#1,"[SHFT C]
     HOICE";:FOR Z=1 TO CL+5
     :PRINT#1," ";:NEXT Z'ISOO
1560 PRINT#1,"[SHFT P]OINTS"'BCMH
1570 FOR X=1 TO NC'DEPH
1580 PRINT#1,C2$(X);:FOR Z=1 TO
     CL+10-LEN(C2$(X)):PRINT#1," ";
     :NEXT Z'JFWS
1590 PRINT#1,INT(VT(X))'CJCK
1600 NEXT X'BBRY
1610 CLOSE 1'BBIA
1620 S$="[SHFT R]UN [SHFT D]ECISION
     [SHFT M]AKER OVER":GOSUB 1730
     :IF YN=0 THEN 1660'FPUP
1630 S$="[SHFT R]EPEAT SAME DECISION"
     :GOSUB 1730:IF YN=0 THEN 50'FNCO
1640 GOSUB 1830:S$="[SHFT P]
     LEASE WAIT A FEW MOMENTS."
     :GOSUB 1680'DMCO
1650 FOR X=1 TO 20:VT(X)=0:PC(X)=0
     :FOR Y=1 TO 50:V(X,Y)=0:NEXT Y
     :NEXT X'LKGT
1655 GOTO 450'BDIK
1660 S$="[SHFT E]ND [SHFT D]ECISION
     [SHFT M]AKER":GOSUB 1730
     :IF YN=0 THEN 1620'FPVR
1670 END'BACG
1680 IF LEN(S$)<39 THEN PRINT
     TAB((40-LEN(S$))/2);S$
     :RETURN'KUHR
1690 PRINT S$:RETURN'CDPJ
1700 GOSUB 1830:S$="[SHFT P]
     RESS SPACE BAR TO CONTINUE."
     :PRINT:GOSUB 1680'ENON
1710 GET S$:IF S$<>" " THEN 1710'FJVG
1720 RETURN'BAQC
1730 YN=0:S$=S$+" ([SHFT Y]/[SHFT N]
     )?":GOSUB 1820'ENRL
1740 IF LEN(S$)<39 THEN PRINT
     TAB((40-LEN(S$))/2);S$;
     :GOTO 1760'KALP
1750 PRINT S$;'BDYG
1760 GET S$:IF S$<>"[SHFT Y]
     " AND S$<>"Y" AND S$<>"[SHFT N]
     " AND S$<>"N" THEN 1760'OPDV
1770 PRINT S$:GOSUB 1800
     :IF S$="[SHFT Y]" OR S$="Y" THEN
     YN=-1'JPSR
1780 RETURN'BAQI
1790 GOSUB 1810:S$="[SHFT I]
     NVALID ANSWER":GOSUB 1680
     :GOSUB 1820:RETURN'FSUU
1800 POKE 646,3:RETURN:REM BLUE'DLDF
1810 POKE 646,10:RETURN:REM RED'DLWG
1820 POKE 646,4:RETURN:REM PURPLE'DNAI
1830 POKE 646,7:RETURN:REM YELLOW'DNHJ
1840 POKE 646,1:RETURN:REM WHITE'DMPJ
1850 I$="":II$="":GOTO 1920'DLEK
1860 GET II$:IF II$="" THEN 1860'ELYL
1870 IF II$=" "OR(II$=>"A"AND
     II$<="Z")OR(II$=>"#"AND II$<="
     [SHFT Z]")THEN 1920'PXIY
1880 IF II$=CHR$(13) THEN 1930'ELBN
1890 IF II$<>CHR$(20) OR LEN(I$)=0
     THEN 1860'IQRS
1900 PRINT " ";CHR$(157);CHR$(157);
     CHR$(162);CHR$(157);'FAAK
1910 I$=LEFT$(I$,LEN(I$)-1)
     :GOTO 1860'FRQJ
1920 I$=I$+II$:PRINT II$;CHR$(162);
     CHR$(157);:IF LEN(I$)<80 THEN
     1860'JKXR
1930 PRINT " ":RETURN'CBDG
```

END

by Mark Jordan

Sequencer

Explore the Commodore 128 in its powerful native mode. Some of the articles in this column may be technical, some not so technical—but we guarantee that they will spark your creativity.



ART BAXTER

Quick, who was the fourteenth President of the United States? Gotcha, right? How about this: who came first, Jackson or Cleveland? If you're thinking, "How can one city come before another?" then you need Sequencer, the program included here.

Sequencer will help you—and any young ones in your family—to learn the sequential order of people, events or any list of items that has a first, second, third order. It does it in a fun manner, via a game which you can either play alone or against a friend.

How to Play

In the solo mode the goal is simply to find the correct sequence of items in a randomly-mixed list in the shortest time possible. The player uses his joystick to scroll through whatever list was selected until he finds the first item. He presses the fire button and, if he's guessed right, it records on a window at the bottom of the screen. The scrolling window, in the upper left of the screen, consists of large letters which are easily readable even as it scrolls by.

Another scrolling window is in the upper-right part of the screen. The computer controls this window. It simply scrolls merrily along until the user gets stuck and needs help. By pushing his joystick to the right, he orders the computer to scroll to the correct item and select it. It's a help screen of sorts and something that will be used a lot in the early stages of learning lists.

In the two-player mode, a second person controls this second window. Then it's simply a matter of who finds the next item on the list first. Credit is given to the player who correctly selects each item. The way this happens is when a player finds the correct choice and fires, the item will appear on the sequentially-correct list at the bottom of the screen with a check mark on the side of the player who found it. A tally is kept of how many correct items each player finds.

In both modes, as the correct items are selected from the random list, they are withdrawn. This means that at the beginning of play things go a little slower (it takes a while just to cycle through 66 books of the Bible). But as you near completion, things speed up considerably. Also, whoever selects the next-to-the-last item is credited with the final one.

Since the timer works in both modes, a pair of players can work together to compete against the clock, or they can work against each other to see who accumulates the most check marks. Either way, in the spirit of competition, knowledge is acquired.

Once the round is over, the completed list can be examined (it scrolls also) as a kind of follow-up study guide. Of course, players have the option to play again.

Lists, Glorious Lists

All arcade-type games instill learning in the process. The trouble is, the learning is often limited to the gameplay itself. Good educational software seeks to use this natural learning environment to plug in information that is useful to learn.

What's useful? A three-year-old might find it useful to sequence the numbers one to ten or the ABC's. Sunday schoolers are often awarded prizes for learning the books of the Bible in order. High school students could work on alphabetical order, the arrangement of planets from the sun, or, as suggested already, presidents. Sports nuts could arrange a list of pennant winners. History buffs might sequence wars. Geography specialists could even arrange lists of cities or countries from east to west. All of us could stand a little refreshing in some area. (Which is closer to the sun, Uranus or Neptune? See what I mean?) In brief, anything that can be listed in order is a candidate for this game.

Before you play it, you (or someone) needs to type in the lists of sequential items. Where do you get the lists? Try an almanac—they have tons of lists in them. Encyclopedias and dictionaries are another good source of sequential information.

The program has a built-in editor which allows you to double-check spellings and order before saving them to disk. A couple of limitations are in order. First, each item can have no more than 12 characters. Thus, if you're typing in the books of the Bible, you'll need to invent an abbreviation for "II Thessalonians" (16 characters). Try something like "II Thessalns."

The second limit is that you are only allowed 75 items in a list. Actually, you will seldom want a list near that long, as it's

too frustrating to go through. In the case of lists of over 50 or so, you might want to type in two separate lists. After having played the game, I've come to feel that lists under ten items are too easy and lists over 40 items start getting too difficult. Of course, if the list has only seven or eight items in it (like the planets of our solar system), then so be it. The program allows for 75 separate lists. You can add them anytime you run the program.

If this program looks long enough for you to dismiss as un-type-in-able, I apologize. I would have made it even longer (to add more convenience), but 23 blocks is about maximum for a magazine to publish. You can always purchase the Loadstar disk which has the program (and the other programs in this issue) on it already. However, I encourage you to get it somehow, especially if you are a parent.

As always, when entering the program, use the Magazine Entry Program at the back of this issue to ensure you have no errors. And please, save this one before you run it for the first time. It contains a machine-language interrupt routine which can lock your computer up if you don't have all your data typed in right. If it's saved and you lock up, you can always reset the computer, reload the program and debug.

Sprite Text-ure

Programmers may want to know how the program does its text scroll. The technique is rather complicated, but here's a brief explanation.

The scrolling text you see is nothing more than four sprites side by side. The vertical expand feature was enabled to make the letters taller. The text is stored in a very strange, but simple, manner—on the graphic screen. To see this, after selecting the file you want, break the program by pressing RUN/STOP-RESTORE. Then type GRAPHIC 1 and press RETURN. What you'll see is the list of times printed vertically on the graphic screen with a space between each letter.

By placing the text on the graphics screen, it's easy to steal the graphic makeup of each character. A machine-language routine is constantly (every 1/60 of a second) moving through this list and copying the data into the sprite memory locations. The result is a smoothly-scrolling text list that would have been very difficult to achieve without using sprites.

Sprites are the reason, by the way, that there is a 12-character limit on items because each sprite only allows for 24 pixels, the equivalent of three characters.

Okay, back to the important stuff: who was first, Jackson or Cleveland? Andrew Jackson was our seventh President, Grover Cleveland our twenty-second. And twenty-fourth. That's right, he was ousted between terms. I wouldn't have remembered that if I hadn't played Sequencer. How about you? ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Sequencer 128

```
10 GRAPHIC 0,1:KEY 8,""'CGCA
20 DIM F1$(80),FF$(80),R1(80),RR(80),
   F2$(80)'BMYF
30 LC$=CHR$(14):E$=CHR$(27)'EOIE
40 P1=3313:P2=3314:P3=256:P4=8206'EBEI
50 FOR T=1 TO 40:Z$=Z$+CHR$(0)
   :DA$=DA$+":":SS$=SS$+" ":NEXT'LCTO
60 SP$=LEFT$(SS$,12):FS$=LEFT$(SS$,20)
   :Z$=Z$+Z$'GFVN
70 LE$="ABCDEFGHIJKLMNOPQRSTUVWXYZ
   [SHFT A,SHFT B,SHFT C,SHFT D,
   SHFT E,SHFT F,SHFT G,SHFT H,SHFT I,
   SHFT J,SHFT K,SHFT L,SHFT M,SHFT N,
   SHFT O,SHFT P,SHFT Q,SHFT R,SHFT S,
   SHFT T,SHFT U,SHFT V,SHFT W,SHFT X,
   SHFT Y,SHFT Z] -1234567890"+CHR$
   (20)+CHR$(13)+CHR$(27):CH$(1)=" "
   :CH$(2)=" "'JEXV
80 FOR T=0 TO 250:READ A$
   :POKE 3059+T,DEC(A$):NEXT'IUNN
90 FOR T=0 TO 157:READ A$
   :POKE 3328+T,DEC(A$):NEXT'IUSO
100 FOR T=0 TO 15:READ A:POKE 3312+T,A
    :NEXT'HPGC
110 COLOR 0,1:COLOR 4,12'CIMY
130 DO'BAJX
140 B$(1)="1-[SHFT C]REATE FILE"
    :B$(2)="2-[SHFT P]LAY GAME"
    :GOSUB 190'DPHL
150 GET KEY A$:A=VAL(A$)'EIQE
160 ON A GOSUB 1480,270'CJPD
170 LOOP'BAKC
190 COLOR 5,15:PRINT"[HOME2,CLEAR]
    "'CFIH
200 FOR T=1 TO 4:CHAR,8,T,LEFT$(DA$,
    24),1:NEXT'GUNE
210 COLOR 5,16'BEYX
220 FOR T=1 TO 2:X$=B$(T)'ELBD
230 G=22-LEN(X$):CHAR,9,T+1,
    LC$+LEFT$(LEFT$(SP$,G/2)+X$+SP$,
    22)'LKIO
240 NEXT'BAEA
250 RETURN'BAQB
270 TT=0'BDME
280 DOPEN#2,"SEQFILES"'BEOH
290 INPUT#2,A$:FF$(TT)=MID$(A$,4)'DSMK
300 IF ST=0 THEN TT=TT+1:GOTO 290'GMUD
310 DCLOSE'BBNY
330 COLOR 5,6:GRAPHIC 0,1'CHJD
340 CHAR 1,4,0,"[SHFT C]
    URSOR TO FILE AND PRESS [SHFT R,
    SHFT E,SHFT T,SHFT U,SHFT R,
    SHFT N]"'BGUP
350 FOR T=2 TO 23:CHAR,13,T,"[SPACE14]
    ",1:NEXT'FOPJ
360 WINDOW 14,3,25,22,1'BNQG
370 PRINT E$"M";'BDNF
380 FOR T=0 TO 19:CHAR,0,T,FF$(T)
    :NEXT'FRWL
390 CHAR,0,0,FF$(0),1:C=0:D=0
    :TS=0'EXLN
400 DO'BAJX
410 GET KEY A$'CCEA
420 IF A$="[UP]"THEN C=C-1
    :IF C<0 THEN C=0'JKPI
430 IF A$="[DOWN]"THEN C=C+1
    :IF C>TT THEN C=TT:GOTO 470'KQLL
440 IF A$=CHR$(13)THEN EXIT'FGCG
450 IF C>TS+19 THEN PRINT E$"V"
    :TS=TS+1'HNDL
460 IF C<TS THEN PRINT E$"W"
    :TS=TS-1'GLML
470 CHAR,0,D-TS,FF$(D):CHAR,0,C-TS,
    FF$(C),1'EEOO
480 D=C'BCGH
```

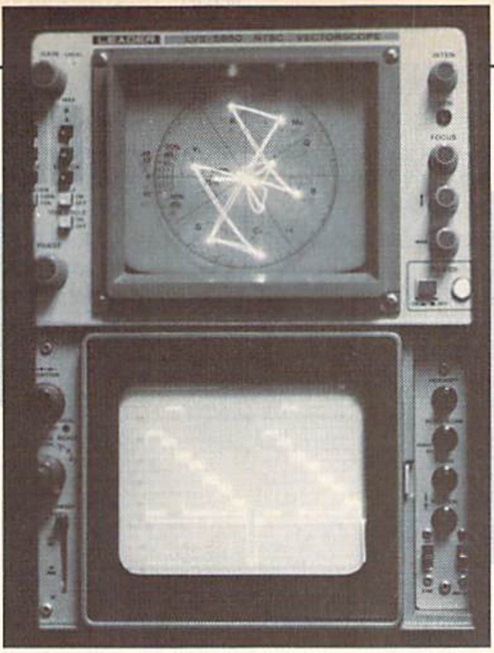
```
490 LOOP'BAKH
510 FILE$=FF$(C)'BLHD
520 DOPEN#2,"SQ."+(FI$):N=1'DMVG
530 INPUT#2,F1$(N)'BICE
540 IF ST=0 THEN N=N+1:GOTO 530'GKMJ
550 DCLOSE'BBNF
560 HL=8192+N*8:POKE 3319,HL AND 255
    :POKE 3320,HL/256'HFSQ
580 B$(1)="[SPACE3]1 OR 2 [SHFT P]
    LAYERS?[SPACE4]":B$(2)=FS$
    :GOSUB 190'DSMR
590 GET KEY A$:NP=VAL(A$)
    :IF NP<>2 THEN NP=1'JQLS
610 FAST:FOR T=1 TO N:RR(T)=T
    :NEXT'GNAI
620 Z=N:FOR T=1 TO N'EGLG
630 R=INT(RND(1)*Z+1)'FIOI
640 R1(T)=RR(R)'BKHH
650 FOR I=R TO Z:RR(I)=RR(I+1)
    :NEXT'GQCM
660 Z=Z-1:NEXT'DEDI
680 GRAPHIC 1,1'BDHJ
690 FOR T=1 TO N+3:T1=T-3
    :IF T1<1 THEN T1=N+T1'LSDU
700 T2=T-1:T3=0:IF T2>40 THEN T2=T2-40
    :T3=1'JXFM
710 FOR I=0 TO 11:CHAR,T2,I*2+T3,
    LC$+MID$(F1$(R1(T1)),I+1,1)
    :NEXT'KLIQ
720 NEXT:GRAPHIC 0'CCBE
740 SLOW:COLOR 5,15:COLOR 4,7
    :PRINT E$"M[HOME2]"
    :GRAPHIC 0,1'FRZN
750 FOR T=0 TO 5:CHAR,0,T,SS$,1
    :NEXT'FPXM
760 CHAR,0,6,"[SPACE3,CMDR Y14,SPACE6,
    CMDR Y14,SPACE3]",1'BHXF
770 COLOR 5,7:CHAR,0,7,SS$,1'COUM
780 WS$="[BLUE,SPACE10,GRAY3,SPACE20,
    BLUE,SPACE10]"'BDOQ
790 COLOR 5,15:FOR T=8 TO 23
    :CHAR,0,T,WS$,1:NEXT'GVJS
800 FOR T=0 TO 1:CHAR,T*30,7,"
    [SHFT P]LAYER"+STR$(T+1),1'IREN
810 FOR J=1 TO 5:CHAR,T*20+3,J,
    LEFT$(SS$,14):NEXT'IVVM
820 CHAR,3+T*20,3,">[SPACE12]<"'DIJJ
830 NEXT'BAEF
840 IF NP=1 THEN CHAR,0,9,"[CYAN,
    SHFT P]USH RIGHT",1
    :CHAR,0,10," FOR [SHFT H,SHFT E,
    SHFT L,SHFT P] ",1'FTFV
850 COLOR 5,7:CHAR,0,24,SS$,1
    :CHAR,17,24,"[SHFT T]OTALS",1'DAAR
860 CHAR,13,0,LC$+"[SHFT F]
    IRE WHEN READY",1'CLAQ
870 IF JOY(1)<128 AND JOY(2)<128 THEN
    870'HPPQ
890 COLOR 5,15:CHAR,0,0,SS$,1
    :CHAR,20-INT(LEN(FI$)/2),0,FI$,
    1'HKFX
900 FOR T=1 TO 8:SPRSAV Z$,T:NEXT'FKFI
910 Y(1)=0:Y(2)=0:M=N:CC=1:TS=1
    :H=0'GAHO
920 OF=1:GOSUB 1220'CIEI
930 TI$="000000":POKE 3071,NP-1'DMSL
940 SYS DEC("0C2B"):POKE 248,
    PEEK(248)OR 64'FORO
960 DO:FOR P=1 TO 2:J=JOY(P)
    :PV=(P-1)*3'JRQT
970 COLOR 5,7:CHAR,18,7,MID$(TI$,4,
    1)+":"+RIGHT$(TI$,2),1'GDWU
980 IF J=128 THEN GOSUB 1250'EIEP
990 IF NP=1 AND J=3 THEN POKE 3327,4
    :H=1:PV=3:P=2:GOSUB 1250
    :POKE 3327,2'LIXB
1000 IF CC>N-1 THEN EXIT'FECW
1010 NEXT:LOOP'CBRU
1030 GOSUB 1370:POKE 208,0'CKFY
1040 OF=0:GOSUB 1220'CIDA
1050 CHAR,2,3,"[L. RED,SPACE4,SHFT U]
     SE JOYSTICK TO SCROLL LIST
     [SPACE4]",1'BHWJ
1060 CHAR,2,4," [SHFT P]RESS [SHFT Y]
      TO REPEAT, [SHFT S]
      FOR NEW LIST ",1'BHHL
1070 WINDOW 10,8,29,23:PRINT'CMPD
1080 DO:J=JOY(1):IF J=0 THEN
     J=JOY(2)'IMMJ
1090 IF J=1 THEN BEGIN:IF TS=1 THEN
     1180'HLCJ
1100 TS=TS-1'CFTV
1110 CHAR,0,0,E$+"W[GRAY3]"+F2$(TS),
     1'DQBB
1120 BEND'BBXW
1130 IF J=5 THEN BEGIN:IF TS+14>N
     THEN 1180'INYF
1140 TS=TS+1'CFSA
1150 CHAR,0,15,E$+"V"+F2$(TS+15),
     1'ETPG
1160 BEND'BBXB
1170 GET Y$:IF Y$="S"OR Y$="Y"THEN
     SYS 3473:EXIT'IMTJ
1180 LOOP'BAKC
1190 POKE 208,0:IF Y$="Y"THEN 560'ELDI
1200 RETURN'BAQU
1220 FOR T=1 TO 4:MOVSPR T,T*24+32,58
     :MOVSPR T+4,T*24+192,58
     :SPRITE T,OF,5,0,0,1
     :SPRITE T+4,OF,11,0,0,1:NEXT'OKBT
1230 RETURN'BAQX
1250 X=INT(((PEEK(P2+PV)*P3)+PEEK
     (P1+PV)-P4)/8)+1:IF X<1 THEN
     X=X+M'QGRS
1260 IF H THEN BEGIN:IF R1(X)<>CC
     THEN 1250'HORI
1270 H=0:POKE 3325,100'CLHF
1280 BEND'BBXE
1290 IF R1(X)=CC THEN BEGIN'EIVI
1300 SOUND 1,5000*P,2:GOSUB 1370'DOGA
1310 FOR T=X TO M:R1(T)=R1(T+1)
     :NEXT'GQME
1320 M=M-1:SYS 3328,M,X+2'ENSD
1330 HL=8192+M*8:POKE 3319,HL AND 255
     :POKE 3320,HL/256'HFRK
1340 BEND'BBXB
1350 RETURN'BAQB
1370 WINDOW 10,8,29,23:PRINT'CMPG
1380 CH$(P)="[SHFT @]":CC$=RIGHT$
```

```
     (SS$+STR$(CC),2)'FVRM
1390 F$=LEFT$(F1$(CC)+SS$,13)'DRUK
1400 F2$(CC)=" "+CH$(1)
     +CC$+"-"+F$+CH$(2)+" "
     :CH$(P)=" "'IGWJ
1410 IF CC-TS>15 THEN TS=TS+1
     :PRINT E$"V"'HORG
1420 CHAR,0,CC-TS,"[GRAY3]"+F2$(CC),
     1'DREF
1430 PRINT"[HOME2]"'BAPA
1440 Y(P)=Y(P)+1:CC=CC+1'EPIH
1450 CHAR,(P-1)*16+10,24,"[BLUE]
     "+STR$(Y(P)),1'GVDK
1460 RETURN'BAQD
1480 B$(1)="[SPACE3,SHFT B]
     EGIN TYPING LIST[SPACE2]"
     :B$(2)=" [SHFT P]RESS [SHFT E]
     SCAPE TO EXIT ":GOSUB 190'DPJW
1490 N=1'BCXH
1500 DO:GOSUB 1780'CFEA
1510 IF P<>66 THEN EXIT'FDMD
1520 F1$(N)=F$:N=N+1:IF N=76 THEN
     EXIT'HQBI
1530 LOOP'BAKB
1540 TN=N:IF F1$(N)=""THEN TN=N-1'GOTJ
1560 B$(1)=" [SHFT E]DIT WITH DELETE
     KEY ":B$(2)=" [SHFT R,SHFT E,
     SHFT T,SHFT U,SHFT R,SHFT N]
      FOR NEXT ITEM ":GOSUB 190'DPDX
1570 N=1'BCXG
1580 F$=F1$(N):BX$=LEFT$(F$+SP$,12)
     :C=LEN(F$)+1'HELR
1590 Q$=".":GOSUB 1790:Q$=""'DKDL
1600 IF N<TN AND P=66 THEN F1$(N)=F$
     :N=N+1:GOTO 1580'JXJK
1620 CHAR,13,8,"[SHFT T]
     YPE FILE NAME"'BGDH
1630 C=1:F$="":BX$=SP$'DMLG
1640 GOSUB 1820'BEME
1650 DOPEN#2,"SQ."+(F$),W'CKWI
1660 FOR T=1 TO TN'DEDH
1670 PRINT#2,CHR$(34)F1$(T)
     :F1$(T)=""'DTYL
1680 NEXT'BAEH
1690 DCLOSE'BBNJ
1710 TT=0:APPEND#2,"SEQFILES"'CIFG
1720 IF DS>0 THEN DCLEAR
     :DOPEN#2,"SEQFILES",W'FLFK
1730 PRINT#2,CHR$(34)"SQ."F$'CIEG
1740 DCLOSE'BBNF
1750 FOR T=8 TO 11:CHAR,10,T,FS$
     :NEXT'FPTL
1760 RETURN'BAQG
1780 COLOR 5,6'BDAJ
1790 FOR T=1 TO 3:CHAR,13,8+T,
     LEFT$(DA$,14),1:NEXT'HWAS
1800 IF Q$=""THEN C=1:F$=""
     :BX$=SP$'GOTI
1810 COLOR 5,8:CHAR,16,8,"[SHFT I]TEM
     [SPACE2]#"+MID$(STR$(N),2)+"
     [SPACE2]"'GRRM
1820 COLOR 5,6:CHAR,14,10,BX$'COJH
1830 DO'BAJE
1840 GET KEY A$:P=INSTR(LE$,A$)
     :IF P=0 THEN 1840'HTRO
1850 IF P=65 THEN BEGIN:C=C-1
     :IF C<1 THEN C=1'KNMP
1860 F$=LEFT$(F$,C-1):CHAR,13+C,10," "
     :GOTO 1920'GXHP
1870 BEND'BBXJ
1880 IF P=66 AND F$=""THEN 1920'FJEO
1890 IF P>65 THEN EXIT'EDNN
1900 F$=F$+A$:CHAR,13+C,10,A$'ERXI
1910 C=C+1:IF C>12 THEN C=12'GKUJ
1920 LOOP'BAKE
1930 RETURN'BAQF
1950 DATA AD,FF,B,D0,3,A9,1,60,AD,,DC,
     60,'BGQO
1960 DATA A2,,86,FE,A0,,B1,FB,9D,C0,F,
     E8,E8,E8,C8,E0'BROR
1970 DATA 40,90,F3,18,A5,FB,69,80,85,
     FB,A5,FC,69,2,85,FC'BVMT
1980 DATA E6,FE,A6,FE,E0,3,D0,DC,60,
     EA,EA,78,A9,3D,8D,14'BVQU
1990 DATA 3,A9,C,8D,15,3,A9,2,8D,F6,C,
     58,60,A2,3,20'BQVT
2000 DATA F3,B,CE,F6,C,D0,B,AD,FF,C,
     8D,F6,C,A2,0,AD'BQID
2010 DATA 1,DC,29,F,49,F,9D,F0,C,DE,
     FA,C,D0,60,BD,FB'BRNE
2020 DATA C,9D,FA,C,EA,BD,F0,C,F0,54,
     C9,1,D0,24,38,BD'BSNF
2030 DATA F1,C,E9,1,9D,F1,C,B0,3,DE,
     F2,C,BD,F2,C,C9'BQRG
2040 DATA 20,B0,C,AD,F7,C,9D,F1,C,AD,
     F8,C,9D,F2,C,4C'BRIH
2050 DATA AB,C,18,FE,F1,C,D0,3,FE,F2,
     C,BD,F2,C,CD,F8'BROI
2060 DATA C,90,8,BD,F1,C,CD,F7,C,B0,
     16,BD,F9,C,8D,A'BQUJ
2070 DATA C,BD,F1,C,85,FB,BD,F2,C,85,
     FC,20,CE,C,4C,65'BSMK
2080 DATA FA,A9,,9D,F1,C,A9,20,9D,F2,
     C,4C,AB,C,A9,'BPAL
2090 DATA 8D,9,C,20,,C,A9,40,8D,9,C,
     20,,C,A9,80'BMRL
2100 DATA 8D,9,C,20,,C,A9,C0,8D,9,C,
     4C,,C'BGAB
2120 DATA 78,85,4F,86,4D,8A,A8,A9,C,
     85,4E,20,5D,D,20,66'BUMG
2130 DATA D,20,75,D,18,69,8,85,FD,90,
     2,E6,FE,20,7E,D'BREH
2140 DATA 20,88,D,E8,E0,50,D0,EC,A4,
     4D,A6,4D,C6,4E,D0,DE'BVYJ
2150 DATA EA,A2,C,20,5D,D,A4,4F,20,66,
     D,20,75,D,20,5D'BSUJ
2160 DATA D,A0,17,20,80,D,A0,50,20,66,
     D,18,A5,FD,69,80'BTFK
2170 DATA 85,FD,A5,FE,69,2,85,FE,CA,
     D0,E6,58,60,A9,,85'BTML
2180 DATA FB,A9,20,85,FC,60,18,A5,FB,
     69,8,85,FB,90,2,E6'BUOM
2190 DATA FC,88,D0,F2,60,A5,FC,85,FE,
     A5,FB,85,FD,60,A0,7'BVQO
2200 DATA B1,FD,91,FB,88,10,F9,60,A5,
     FE,85,FC,A5,FD,85,FB'BWRG
2210 DATA 60,78,A9,65,8D,14,3,A9,FA,
     8D,15,3,58,60'BORF
2230 DATA 1,,32,2,,32,,,,14,1,1,15,1,
     1,2'BFFF
```

END

by Matthew Leeds

Professional Genlocks for the Amiga



The Amiga has rapidly become an accepted alternative to expensive character generators, animation systems and paint systems in professional video applications. Its powerful graphics co-processors, wealth of software and ease of use have given it a strong price/performance edge over dedicated video products. Large numbers of industrial, corporate and cable video producers have purchased Amigas for use in a video production environment.

One key to the Amiga's usefulness in a video environment is the ease with which it produces real video. Most computer systems' output cannot be easily converted to true "broadcast-quality" video, nor can their output be genlocked to the rest of the video sources in a production environment.

Amiga genlocks actually perform several functions. First, they convert the RGB output from the Amiga into composite video. This process is known as encoding to NTSC. The "broadcast" standard for NTSC is known as RS-170A, a complicated set of specifications to which a video signal must adhere. These specifications include sync and black burst, subcarrier to horizontal phase (SC-H), color framing, setup level, gain and other critical elements.

Secondly, they lock the timing of the encoded Amiga-generated video to that of an external video signal. This is what the video industry calls "genlocking." It is essential if you are going to mix or edit two or more video sources together. If you cut or fade from one video source to another that are not genlocked together, the image will jump or roll during the cut or fade. Generally every video source in a production environment is genlocked to a master sync generator (house sync).

Thirdly, they allow you to overlay your Amiga-generated graphics on top of an incoming video image. At the simplest level this is done by replacing the Amiga's color 0 image with the incoming video signal, but some more sophisticated hardware allows other options. Some systems offer slider controls or switches to vary the amount of overlay or the timing of a controlled fade-in or fade-out of the mix. Some also allow software control of these features.

I've had the opportunity to test and use three high-end Amiga-specific genlocks: SuperGen, Magni 4004 and GEN/ONE. Each was connected to a vector scope and waveform monitor (test equipment for measuring compliance to NTSC standards and quality of video signals) for quantitative testing, and each was also connected to a videotape recorder for qualitative testing (I looked at the resulting tape for color fringing, rainbowing and other artifacts).

Below is a table of information on the three genlocks. It is by no means complete in the sense of covering every aspect you should consider in evaluating a genlock, but it does give you some quick data on each genlock.

	Magni	SuperGen	GEN/ONE
Overlay output	1	2	2
Key output	1	1	1
RGB passthru	Y	Y	Y
Reverse key	Y	Y	Y
Loop video	N	Y	Y
Y/C input	N	N	N
Y/C output	N	N	Y
Power supply	Amiga	Amiga	External
Adjust timing	Not easy	Void Warranty	Easy
Software control	Y	Y	N
Fade controls	Optional	Y	N
Luminance fade	Y	Y	N
Blanking select	Y	Y	Y
GPI control	Y	N	N

A short explanation of some of the items in the table may help. The overlay output is the combined Amiga/external video output. The key output is a signal used by a switcher to mix to other video signals (think of it as a stencil generated by the Amiga). The RGB passthru allows the use of a standard RGB monitor while the genlock is in use. A reverse key essentially allows the external video to show through everywhere except color 0. Loop video passes the external video without adding the Amiga's graphics. Y/C input and output are used in S-VHS and ED-BETA applications. Adjust timing indicates how easy it is for a video engineer to gain access to the "fine tune" controls. Software and fade (hardware) controls let you control the mix of external video and Amiga graphics. Luminance fade lets you control the mix via the relative brightness of the Amiga's image instead of using color 0. Blanking select lets you chose between using the Amiga's video timing and genlocking to an external video source. GPI controls are used in professional video production to trigger an event (i.e., a fade or cut).

SuperGen

Manufacturer: Digital Creations
2865 Sunrise Blvd.
Suite 103
Rancho Cordova,
CA 95670

Price: $749.00

The SuperGen from Digital Creations was the first professional genlock on the market specifically for the Amiga. It is a solid-looking unit, with BNC connectors on the back and slider and switch controls on top. Installation is simple. A cable connects to the RGB port on the Amiga, your Amiga monitor connects to the RGB passthru connector, and the video input and output cables connect to the BNC connectors at the back of the SuperGen.

Although connecting the SuperGen is easy I was dismayed to discover that the cable connecting the SuperGen to the Amiga was permanently connected to the SuperGen. This meant I could not install

a longer cable should I desire (and I did, since the one provided was far too short for my liking) or should it become defective. Further, the plug on the end of the cable was a butchered 25-pin connector (one end had been ground down to fit the 23-pin RGB port on the Amiga). It was far too easy to misinsert the plug and damage either the Amiga or SuperGen. This appeared to be cost cutting at the expense of the user.

Once connected, the SuperGen performed well. It passed the vector scope and waveform monitor tests well within specification limits. It did appear to need minor adjustment to its gain level, but this is normal for video equipment that must be matched to existing levels in a production studio. However, this presented a problem. To gain access to the gain adjustment, you must break a seal on the underside of the SuperGen, voiding your warranty. I can understand this restriction on strictly consumer equipment, as the average consumer would not have access to the needed test equipment, but every professional would not only have access, but is likely to need to perform this type of adjustment.

On the qualitative tests the SuperGen also did well. It does a good job of encoding the Amiga's graphics to composite, with a minimal amount of color fringing and ringing. The notch filter provided is useful for reducing these types of artifacts, but should not be used if fine detail is present in the Amiga's graphics.

The SuperGen was the only unit that had controlling software available for use at the time this article was written. Two programs are offered: one lets you control fades via a joystick, and the other lets you assign fades and cuts to the ten function keys. The software worked very well. I was easily able to set up my function keys to initiate adjustable-length fades and instant cuts. Digital Creations has made the core of this software available to other developers, and several Amiga video applications now offer direct control over the SuperGen.

I did find one glitch in the software. The function key software installs an input handler that looks for the Left-AMIGA/ESCAPE combination. This combination is used by other programs *(PopCLI, Mackie)*, and if these programs are running a conflict is created. I would have liked to have had the option of assigning another hot-key combination to the SuperGen software (perhaps as a ToolType in the icon).

The SuperGen offers several advantages. It is the least expensive of the three genlocks. It can be used on all three Amigas (although on a 500 with other peripherals I would consider a beefed up power supply). It is supported through software by several other applications, and has good software control of its functions. It is very forgiving of the quality of the external video it genlocks to, allowing the use of consumer quality VCR's.

Magni 4004

Manufacturer: Magni Systems
9500 SW Gemini Dr.
Beaverton, OR 97005
Price: $1695.00

Magni Systems' Magni 4004 is a two-board set that installs in an Amiga 2000. One board installs in one of the IBM expansion slots and the other installs in the video expansion slot next to the power supply. These two boards are connected via two ribbon cables inside the 2000. The board that installs on the IBM side has an external DB9 connector. This is connected to a provided cable with four BNC connectors. The video expansion card has a 23-pin connector that accepts a standard Amiga monitor cable and passes the RGB signals. This card also has a 25-pin connector that is used to connect an external control box (more on that later).

The IBM board installed easily, not so the video expansion card. It required a great deal of force to seat in the edge connectors, and would not align correctly with the screw holes on the chassis. As a result I could not securely fasten the board in place. However, given the amount of force it took to seat it, it showed no inclination to move around. I transported my 2000 with this board installed several times, and it never became unseated. Other boards installed in this slot did not require extreme measures during installation, so I must assume that the Magni board was slightly out of tolerance. This did not affect its operation in any way.

The Magni passed the quantitative tests with flying colors. It was only marginally out of adjustment for gain. To gain access to the adjustment controls you must open up the Amiga, but since this should only occur once, it is not a major concern. I would have preferred to have seen these controls accessible without opening the Amiga. I did discover that the Magni is a little more finicky than other genlocks regarding the quality of the external video you feed it. It would not lock up to an older VHS VCR that I tested it with, although it worked fine with several other consumer decks I tested. Given that the Magni is designed for professional use, I would expect you would rarely feed it this type of low-quality signal.

The qualitative test showed that the Magni puts out a rock-solid image. Fringing and dot crawl were at a minimum, and even fine detail held well. If price is no object, the Magni comes out on top here.

The Magni accepts either an external video or burst signal to genlock the Amiga's graphics. The output can be either an overlayed mix or downstream key or straight Amiga graphics. It will also generate internal sync and provide burst output to act as master sync.

The optional external control box provides a remarkable variety of functions. You can control fades (and their rates) from full video to overlays, you can set either normal or reverse keys, select color 0 or luminance keys, set the luminance level of the key, instantly cut to video only or overlays, and instantly turn keying off. The control box is connected with a generous nine-foot cable (a standard DB25 to Centronics printer cable).

These same features are also accessible via General Purpose Interface (GPI) control. This is a standard interface protocol used in the video industry. Magni has also announced software that will offer these same functions controlled directly by the Amiga. The software was not available during my testing. ***[Editor's Note:** Magni's Software Control will be a standard feature instituted on all 4004's shipped after November 1988. Current users can upgrade by contacting Magni.]*

The Magni is the performance leader among high-quality genlocks for the Amiga. Magni Systems has been designing and manufacturing video hardware for the broadcast market for years. The Magni 4004 with external controller offers the maximum amount of flexibility in mixing the Amiga's output with external video. Now that software control is available, it is possible that third party developers will also support the Magni in their applications.

GEN/ONE

Manufacturer: Communications Specialties Inc.
6090 Jericho Turnpike
Commack, NY 11725
Price: $895.00

The GEN/ONE from Communications Specialties is a newcomer to the Amiga community. It is a stand-alone unit that can be connected to any Amiga. It has its

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by Graham Kinsey

Amiga Public Domain



ED SAUK

This month's column features a huge attraction. Does the title *Star Trek* interest you? Well, if it does you won't want to miss my review of an incredible game at the end of this month's column! Other highlights this month include a terminal program with an outstanding implementation of Zmodem, and the first BADGE Killer Demo Contest entry for 1988 to appear in the Amiga PD arena.

For each program, the author is given when known, along with the AmigaZone download file numbers for programs obtained from PeopleLink. (If no file number appears, it may still be on PeopleLink, but I obtained it somewhere else.) When a public domain program has been classified as shareware, this is also mentioned with the suggested amount.

Due to the large size of animation files being released for the Amiga, I have decided to assume that the normal size of an Amiga animation is *one megabyte*. Unless I specify otherwise, *all* animations reviewed here require one megabyte to run. 512K Amiga owners should keep this in mind.

AZComm: by SS Patel (AmigaZone file #13942)

Yet another hacked version of DJ James' well-known terminal program, Communicator version 1.34. AZComm is similar to ProtoComm (reviewed in the November '88 installment of this column); the only significant addition in AZComm is the Zmodem protocol. However AZComm differs in two areas. First and most importantly, AZComm's variant of Zmodem is both highly robust and efficient. The author wrote this program because there was no Amiga terminal program that could handle Zmodem transfers efficiently at 9600 baud and above. If you are lucky enough to have a 9600 baud (or possibly even a 19,200 baud modem), AZComm is *the* terminal program you want to have for transferring files.

AZComm's Zmodem is also very good at handling line noise. When attempting to transfer files with a friend of mine, only AZComm had a Zmodem protocol that could handle the line noise (*Online!* v2.01, ProtoComm and RZ/SZ (for use with *Access!* v1.42) could not handle the line noise).

It is worth mentioning that unlike ProtoComm, AZComm does not disable the protocols contained in the source code of Communicator v1.34. This means that you can use Xmodem-CRC or WXModem with AZComm if you must.

Conman version 1.3: by Bill Hawes (AmigaZone file #14027)

Version 1.3 of Bill's great CLI improvement program Conman (last discussed in the November '88 installment of this column) includes improvements to a fix to the F1/F2 keys so that rapid shrinking and zooming of the Conman window won't crash the Amiga. Also, two new handlers, CND: and CNX:, have been added that give invisible type-ahead input and Conman abilities to any Exec device respectively. Now that 1.3 is out and everybody can use Commodore's AmigaShell, let me emphasize that from the console point of view, Conman is superior to AmigaShell. For example, I find Conman's ability to shrink the window indispensable!

Friends: by Michael Warner (AmigaZone file #13978)

A simple graphics display hack for "lonely" mouse pointers. You can vary the speed and "randomness" of these friends via run-time parameters.

PcPatch: by Werner Guenther (AmigaZone file #13973)

If you own an MS-DOS compatible with a 3.5-inch drive (or have access to one), this utility will basically allows you to copy MS-DOS files on your Amiga without having to bother with a 5.25-inch drive or 5.25-inch floppies. PcPatch will patch the PCCopy and PCFormat utilities on the 1.2 Extras so that these utilities will read, write and format 360K 3.5-inch floppies. Although this particular format is seldom used on an MS-DOS machine, all MS-DOS 3.5-inch drives can read/write from/to these disks (although not all may be able to format 360K 3.5-inch floppies). Please note that since this program is a binary patch program, it may *not* work on the 1.3 versions of PCCopy and PCFormat.

ShowANIM version 5.3: by Gary Bonham (AmigaZone file #13661)

Version 5.3 of the familiar ANIM player ShowANIM (which to my amazement I've never actually reviewed by itself before, although I've talked about it many times when reviewing other programs). This major update to ShowANIM includes new features like PAL support and three levels of overscan support—none, medium (352/704 × 220/440) and severe (384/768 × 240/480).

Other new features include variable playback speed (Either from the keyboard's function keys or from the command line) and color cycling support. The other major improvement is that now icons are supported. You can now create an icon by which an ANIM format animation can be run from the Workbench!

However, unlike Display (reviewed in the December '88 installment of this column), you have to create the icon first. While ShowANIM's icon support may be favored by those who create commercial or PD disks, new Amiga users would be wise to use Display instead, since additional work is necessary in order to run an ANIM format animation from the Workbench.

NotBoingAgain: by Dr. Gandalf (AmigaZone file #14144)

This is the first entry of those submitted for the First BADGE Killer Demo Contest to appear in the Amiga PD community. NotBoingAgain is a hilarious animation which reminds you not to bore your

Amiga by running old animations over and over again! The frames for NotBoingAgain were created with *Sculpt-3D* and then assembled into an animation with Movie. Sounds that were created with *PerfectSound* were added to the animation for the finishing touch.

Showiz: by J.L. White (AmigaZone file #12844; Shareware: $10)

A powerful IFF ILBM picture/ASCII text display program. The program can work from Workbench, but using it from CLI is the way to access all its features. Showiz will display any ASCII text file (so long as you have first added asterisks and a header line required by the program), using up to three colors—one for the text itself, one for the background color and one for a shadow color.

However, the best part of this program is how it displays IFF pictures. Although it does claim to handle all types of IFF pictures, including HAM and overscan, what makes Showiz unique are all the wipes available. With Showiz you have 23 different wipes to choose from (and as the author states in the docs, that works out to only 1K of code per wipe). Available wipes include checkerboard, fades, slides, block wipes, growths (both inward and outward) and shrinks, splits, inverts, puzzles, strips and trails.

One fantastic use of this program is to display all the pictures in a hard disk's huge directory while cycling through all the wipes. You can also choose wipes for each individual picture. You can tell Showiz to show each picture just once, or to loop indefinitely (until the ESCAPE key is hit). You can also choose how long Showiz will display a given picture (although you can use the left mouse button to tell Showiz to move on before the interval is up). Not all wipes will work with HAM and overscan pictures, but if that's the case then Showiz will just use a default wipe instead.

Showiz isn't designed to use script files, but knowledgeable Amiga users can overcome this problem. The only problem I see with Showiz is that it will not display both pictures and text files in the same slideshow. But for such a small program, Showiz still gives you many wipes and features to use.

Amy Today: by Jon Rydell (various AmigaZone file numbers)

This is a biweekly on-line newsletter covering the Amiga. Issue 5.3 includes a feature on Steve Jobs' NeXT machine and how it relates to the Amiga. This is another source of up-to-date Amiga information for modem users.

Star Trek: by Eric Gustafson

Whether you are a *Star Trek* fan, or just like games, or are interested in graphics programming using *The Director,* you simply *must* check this game out! We've seen games for the Amiga and programs (usually animations) created with *The Director,* but never have we seen an animated game created with *The Director.*

After an introductory animation, you are presented with some text that is nicely displayed using the program Startle (reviewed in the April '88 installment of this column). Among other things this text file contains Eric's attempt to solve the copyright problem posed by a heavily-protected name such as *Star Trek.* Eric states that if a licensed commercial *Star Trek* game ever appears for the Amiga, you must destroy any and all copies of this game.

Next a great animation sequence appears. This is none other that the *Star Trek* opening scene. Hearing Captain Kirk say "Space — the final frontier . . ." while the Starship Enterprise zooms across the screen is sure to grab anybody's attention!

Finally, the main game screen appears. Most of the screen is taken up by a large view of the bridge of the Enterprise, filled with all the well-known crew members. Alongside this scene are pictures of each of the seven crew members. You will spend most of the game clicking on these seven pictures, to use the talents of each crew member. The object of the game is to recover valuable lost data files (crucial to the security of the Federation), which have been scattered across the galaxy and are hidden on various planets.

You start the game far from any solar system, so you must first warp to a solar system. When you click on Sulu's image, the movement controls appear. If you go to the star map, you can select a star system to warp to. If you want more information on any star system, just click on Spock's image after selecting a star system, and he will tell you how many planets are in the system, as well as whether the system is controlled by the Federation, by Klingon or Romulan forces or is neutral.

If you decide to warp to this system, just click on Sulu then access the drive controls, which of course include warp speed controls. Once you select a desired warp speed, a moving star field appears, and there is an appropriate pause (even an Amiga can't travel 50 light years instantaneously) followed by a familiar attention signal to let Captain Kirk (the character you control in the game) know that you have arrived at the destination.

Once you have entered a solar system, you need to examine its planets. After you have accessed Sulu and have selected a planet from the solar system display (yes, of course I realize that it's kind of silly for Sulu to have to do this when Spock should be doing this, but it appears that Eric used this method to reduce some of the programming requirements), Spock will give you information about the planet. Although there are many planets, you are looking only for planets that support life. Once you find one, you access Sulu and select an impulse speed to move over to the planet.

Once you have reached the planet (you'll know when you are there!), you can have the party beam down to the planet. After the crew beams down (in glorious color as befits the Amiga), the hard part begins. You must overcome several obstacles, including locked doors, force fields and robots before you can even find out if one of the missing data files is on this planet.

First you must use the Tricorder to obtain a reading on exactly what blocks your path. Once you have done that, you need to ask the crew members what to do about the obstacle. Each will give you different opinions. When you finally get an opinion you agree with, just click on the suggestion box, and the crew member who gave that opinion will attempt the feat. If he/she is lucky, it will work. But usually the suggestion isn't a good one, and as a result the crew member is usually injured as a result. In fact, when a suggestion doesn't work, you can count on the crew member being incapacitated (like I said, this is the hard part). Of course, you have seven crew members to work with, but since there are many things that you can try and several obstacles to overcome on each planet, you rarely get to the final area on the first try.

Once every crew member has been injured, your only choice is to beam back to the Enterprise, and click on Bones' picture on the main screen, so he can start to heal everyone. Each time you access him, you get an update on the conditions of each crew member.

When you eventually solve all of the obstacles, you may finally locate one of the missing data files. But you may walk into something less favorable, such as a Gorn spy, or even worse—the Tribbles! If you do

come upon a group of Tribbles, you are in *serious* trouble. Dedicated Trekkies have an advantage over the rest of us in terms of solving this problem.

Now if the game still sounds easy to you, it's because you haven't heard all of it yet. You don't really think that the Klingons and Romulans will sit idly by while these data files are loose? Naturally, their forces will be prowling the galaxy for them as well, especially in the areas that they control. Therefore, if you warp to a hostile system, sooner or later you will hear the familiar red alert siren.

Once this happens you must quickly click on Chekhov's picture to access the weapons console. First, of course, you must choose whether you want to defend yourself with phasers or photon torpedoes. Then you simply click on the firing display. While the Klingon ship is always in view, you must first establish a lock on the ship before you can fire at it, and establishing a lock is not easy.

Once you have defeated the foe(s), you can access Spock to find out the current shield strength as well as whether the ship has been damaged. You may also want to access Scotty at this time to find out the current status of the engines in terms of warp and impulse power availability. If the ship isn't in good shape, you can try to find a planet that has an automated repair dock, if you can still move, that is.

All this may sound exciting, but it is even better when you can actually see and hear what's going on. The color graphics and digitized sounds embarrass the standard ASCII *Star Trek* games that have been around for years. Although all the graphics are in color, most didn't start out that way. Eric used PerfectVision to capture graphics directly from the TV show. However, most pictures were actually captured in black and white and then colorized using several different graphics programs. And although the color graphics certainly aren't great by Amiga standards, they sure beat ASCII symbols!

This game is amazing because it was done by just one person. Although Eric had some help researching *Star Trek* facts, he did all the graphics and programming work himself. What's also amazing is that this is only the initial release version of the game. In the next version Eric plans to add 3D animations and much, much more (including parts of the game that he couldn't finish in time for the first release).

I hope you are as excited about this game as I was when I first saw it. If nothing else, this is further proof of the Amiga's capabilities (with the help of *The Director).*

There is still a little time left for everyone to give me suggestions on which Amiga PD programs were the best in 1988. I'm looking for the PD programs you feel were the best of '88, *and why.* So don't just send me a list of your favorite PD programs without also telling me why you feel these programs deserve special recognition. Please don't select old programs (i.e., programs that appeared before 1988) unless said program received a major upgrade in the past year. I will only consider such a program's new features that were added in 1988. If you are recommending a program that you read about in my column, please make a note of which issue it was reviewed in; if the program was never reviewed in my column please note that instead. Please send all recommendations to:

Best of Amiga PD '88
1015 S. Quincy Ave. #112
Quincy, MA 02169

I will be asking for suggestions from the folks who frequent PeopleLink's AmigaZone as well. But for those who don't have access to PeopleLink, The deadline for sending in your suggestions via mail is February 28, 1989, so don't delay!

Due to circumstances beyond my control, I've once again accumulated a backlog of new Amiga PD programs from PeopleLink. So next month's column should be packed with reviews of new PD programs (assuming I can catch up, of course). New programs to be discussed include a new update to an old program that is finally now destined to make sure that nobody ever uses AmigaDOS' DiskDoctor command again.

As always, I can be reached on the AmigaZone on PeopleLink (ID: G KINSEY), or on the IDCMP BBS (617) 769-3172 (300/1200/2400 baud, 105 MB online, running 24 hours a day), addressed to SYSOP. If you have written a public domain/shareware/freely distributable program, or have obtained one that you think is worth mentioning to all Amiga owners, please attempt to contact me via the above or through *Commodore Magazine.* See you next month.

To sign up to PeopleLink and their AmigaZone, call them at:
(800) 524-0100 (voice)
(800) 826-8855 (via modem)

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own power supply, a definite plus for 500 owners. It connects to the Amiga via the RGB port. The supplied cable is painfully short—less than a foot long. This may be to reduce RF interference, but it makes placement of the GEN/ONE difficult. It does passthru the RGB signals, but you will not be able to use your standard monitor cable, since the passthru connector on the GEN/ONE is a DB9 and not a DB23. Poor planning.

The GEN/ONE did a good job on the quantitative test. It required a minor adjustment on its gain level, but this was simple as the GEN/ONE is the only unit of the three tested that provides front panel access to the gain control out to the horizontal and vertical position of the image, the SC-H phase, and the input levels of the incoming R, G and B signals.

On the qualitative test the GEN/ONE did a good job. Communications Specialties has used a comb filter in the luminance channel to eliminate NTSC artifacts. There are varying arguments regarding the use of comb filters when encoding computer-generated graphics due to their need for an exact line length. Although using a notch filter loses some fine detail, it does tend to "sharpen" an image, and I prefer that option.

The GEN/ONE was the only unit to offer Y/C output. This is used with a S-VHS or ED-BETA VCR. The lack of a Y/C input was very disappointing, and made maintaining the quality of a Y/C source impossible when overlaying the Amiga's graphics. It does allow the use of the Amiga as a source in a Y/C environment, but it is not a complete Y/C system. This is a vital oversight in my estimation.

There is no provision for external control or software control over the GEN/ONE. There are no slider controls, no software fades. It does offer reverse and downstream keys, loopthru video, and dual overlay outputs. Its main advantages are its Y/C outputs and external power supply, plus its front-mounted adjustments.

Selecting the right genlock requires a careful evaluation of your needs. Will you be integrating the Amiga into a production environment? Are you using S-VHS? Do you need external or software control over fades and cuts, or will you be using a downstream switcher? What Amiga do you own, and how much can you afford for a genlock? Regardless of which system you finally choose, you can be certain that your Amiga will offer you many years of quality video production.

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group already specified. For example, if the second group specified that this is a note on message, then group three would specify the channel number.

Byte #2 Data Byte

Bit #	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]
Binary Value	0	1	1	0	0	0	1	0
	↑ Indicates Data Byte							

Data bytes have a much simpler structure than status bytes. They have just two groups of bits. The first group is the single bit number 7, which always has a binary "0" in bit number 7 position. When MIDI sees a binary "0" in bit number 7 position, it knows it is reading a data byte rather than a status byte. The remaining 7 bits, bit numbers 6 through 0 comprise the second group. These bits transmit a data value between 0 and 127.

MIDI must send a minimum of two or more bytes of information depending upon the message. We will go into greater detail on message structure later on.

MIDI In, Out and Thru

Although MIDI requires only two wires, it uses a standard 5-pin DIN plug (See figure 4). Standard MIDI keyboards have three MIDI ports labeled In, Out and Thru.

The MIDI In port receives messages from other synthesizers or sequencers. If the message is meant for that particular device, it will respond as if someone were controlling or playing the synthesizer. If the message is for another synthesizer, it will ignore the message.

The MIDI Out port sends messages out to other synthesizers, drum machines or sequencers.

The MIDI Thru port retransmits any information received on the MIDI In port regardless of whom the message is sent to.

Circuit Construction

Our circuit implements one MIDI Out port to utilize the computer as a sequencer (See figure 5). You should consider this a training device to learn the fundamentals of MIDI's (see Apology at end of article).

MIDI as stated is a serial 31,250 baud transmission. The circuit uses a 6502 UART (Universal Asynchronous Receiver Transmitter) chip. (See photo and schematic.) The UART chip takes parallel information from the user port and transmits it serially at the 31,250 baud rate. The baud rate of the UART is determined by the clock pulse it receives on pin 40. We provide the clock pulses for the UART. We start with a 2 Mhz clock whose frequency is divided by four by the 4013 chip. The frequency leaving the 4013 is therefore 500,000 Hz. The UART chip requires a clock frequency 16 times greater than the baud rate required. Therefore, 500,000/16 = 31,250 which is just what we need for MIDI. The UART automatically adds one start and one stop bit per byte of information. Although the serial data out of the UART is TTL logic, the PNP transistor provides the necessary current loop and signal inversion.

MIDI Cables

MIDI cables are rather easy to make (See figure 6 and Parts List). Just make sure you keep the internal wires straight, and keep the length of cable under 50 feet.

Programming MIDI Messages

Programming the device is easy once we understand the proper format to communicate on the MIDI interface.

First, let's talk about channels. There are 16 MIDI channels available, numbered 0 to 15. It is therefore possible to connect and operate 16 MIDI instruments at once. Each instrument occupies one channel and will respond only to messages sent with that channel identification number. Electronic synthesizers have a channel-select knob to set the channel number (0 to 15) 1 through 16 for the synthesizer.

The channel number is an area of possible confusion. Many MIDI references use the channel range of 1 to 16. The range 1 to 16 makes for easy identification, but when we program the device we must use the numbers 0 to 15. In effect number 0 equals channel 1, number 1 equals channel 2, and so on. Now let's put together a simple note on message to be sent via MIDI. A note on message requires three bytes of information.

Byte #/Type	Decimal	Binary	Meaning
#1 Status	144	10010000	Note On, channel 1
#2 Data	60	00111100	Note Value, 60 = middle C
#3 Data	64	01000000	Velocity, key pressure

Byte-by-Byte Analysis

Byte #1 "1001000"

Looking at the binary equivalent, there is a "1" in bit 7 position, so it obvious that this is a Status Byte. The next group "001" is the code for Note On, The four remaining bits "0000" show the channel number, which in this case is channel 1.

Byte #2 "00111100"

The next byte, decimal 60, we can see from the binary equivalent the bit 7 position contains "0" making this a data byte. The numeric value of this byte (0–127) determines the pitch in half steps, the higher the value, the higher the pitch. The value of 60 specifies a middle C note.

Byte #3 "01000000"

The third byte in the note on message is a data byte that specifies the key velocity, which is how hard or fast a key was hit. The higher the number, the higher the velocity. A value of 0 indicates no velocity and is equal to a note off. For keyboards that are not pressure sensitive, 64 is a default velocity.

The above three bytes sent over a MIDI channel will trigger a middle C note. The note will sustain until we send a note off message as follows:

Bytes #/Type	Decimal	Binary	Meaning
#1 Status	128	10000000	Note Off, channel 1
#2 Data	60	00111100	Note Value, 60 = Middle C
#3 Data	0	00000000	Velocity

The above three bytes sent over a MIDI channel will release a middle C note on channel 1. Let's analyze these bytes also.

Byte #1 "10000000"

Bit number 7 is a binary "1" which specifies a Status byte. Bit numbers 6, 5 and 4; "000" is the code for Note Off. Bit numbers 3, 2, 1 and 0; "0000" specify channel number 1.

Byte #2 "00111100"

Same as byte number 2 of note on message.

Byte #3 "00000000"

Same as Byte number 3 of note on message. Velocity value equals 0 in this message.

More Messages

A synthesizer can't perform a function it's incapable of even if it is requested via the MIDI channel. Pretty obvious statement, but necessary. If you tell your synthesizer to do a patch change or pitch change and it doesn't have the internal capabilities, it can't respond to your request. This doesn't mean the MIDI interface isn't working or that your synthesizer is broken.

There are a lot more messages that can be sent via MIDI. We can't go over all of them, but we'll try a couple more. For a

more extensive list of MIDI commands pick up some books on the subject.

Patch Change

The synthesizer I'm working with has a number of preprogrammed instruments I can select from. If the synthesizer you're working with also has this you can change instruments via MIDI.

Byte #1 "1100xxxx"
Bit number 7 is a binary "1" which specifies a Status byte. Bit numbers 6, 5 and 4; "100" is the code for patch change. Bit numbers 3, 2, 1 and 0; "xxxx" specify channel number.

Byte #2 "0xxxxxxx"
Bit number 7 is a binary "0" which specifies a Data byte. Remain bits (6-0); "xxxxxxx" specifies the patch number.

Pitch Change Bend

Byte #1 "1110xxxx"
Bit number 7 is a binary "1" which specifies a Status byte.
Bit numbers 6, 5 and 4 "110" is the code for pitch change.
Bit numbers 3, 2, 1 and 0; "xxxx" specify channel number.

Byte #2 "0xxxxxxx" and Byte #3 "0xxxxxxx"
Bit number 7 is a binary "0" which specifies a Data byte.

Remaining bits specify the number of the new pitch. Bytes 2 and 3 represent a number in low-byte high-byte format. Since each data byte can represent a number 0 through 127, they can combine to provide a number with the range of 0 to 16,384. Byte number 2 is the least significant byte (LSB) and Byte number 3 most significant byte (MSB). A value of 8192 is the center setting. Values less than 8192 will lower the pitch and values above 8192 increase the pitch.

Program

The BASIC program that accompanies this article operates on both the Commodore 64 and 128. This is a simple program that plays a few notes. With modifications you can implement chords, patch changes and a host of other MIDI commands. This is equivalent to a single-track sequencer. To create a multi-track unit would involve machine-language programming.

The variables in line 20 are simple note information as follows:

C = Note On, channel 1
D = Velocity
E = Note Off, Channel 1
F = Velocity
J = User Port address

The data statements hold the note and time information. You can add and modify the data statements to compose your own songs.

Our computer should be configured as device 1 in figure 6. The cable leaves the interface device and plugs into the MIDI In socket of your synthesizer. Run the program, if everything works you can start composing music.

An Apology

When I began this project I didn't realize the tremendous amount of software and hardware that was already available. Most commercial devices are interfaced to the expansion port on the computer. This in itself isn't difficult, and by taking this approach one could also implement the "MIDI In" and "MIDI Thru" ports. I also believe that there are some powerful software packages available that could be purchased without buying any hardware, provided our MIDI device emulates one of the commercials MIDI devices. These software packages are more powerful than anything we could put together for the project. I planned on doing expansion port projects. I'm afraid I just didn't get to it.

The expansion port is more versatile and powerful than the User Port. So the first article I planned for the Expansion Port is a pin-by-pin description with projects just as I have done with the User Port. I didn't want to throw caution to the wind and jump into an expansion board project without everyone knowing exactly how the expansion port operates.

In essence I apologize for offering a project that is less than it could be. But I will make a commitment to make MIDI one of the first expansion board projects. And in the interim I'll search to find a suitable software package to go with it. I'd advise anyone building this project not to hardwire the circuit together so that you can still use the parts when we move it over to the expansion port.

MIDI by Modem

There are a number off BBS's across the country that have MIDI information available. These are excellent places to drop in to pick up some tips. Many have downloadable text files and patches for most synthesizers.

East Coast MIDI Bulletin Board: (516) 928-4986

CompuServe: Type GO MIDI to bring you to MCS MIDI Forum. Use local phone number.

Delphi: Music City SIG has MIDI information. Use local phone number.

CD + MIDI

CD's are just beginning to be encoded with graphic images. The Talking Heads' album, "Naked" is the first CD released in the U.S. that has been encoded with graphics information. When Philips and Sony published the standard for CD's in 1984, they specified 95% of the disk to be used for sound. The remaining space was reserved for subcodes. This space is now being filled with graphics and soon with MIDI information. As soon as Philips and Sony approve the CD + MIDI standard these devices will appear on the market.

With the MIDI information from the disks, your home synthesizers will be able to play the music on the disk. Also, once the information is extracted it allows you to manipulated the music. You would be able to do things like dropping tracks, or lowering the volume on some tracks, changing the tempo, pitch or print out sheet music.

Parts List

Qty.	Item	Part Number
MIDI Cable		
(2)	5 Pin Din Plug	Radio-Shack # 274-003
(1)	2 Cond. Sheilded Cable	Radio-Shack # 278-1276
MIDI Interface		
(1)	UART	Digi-Key PN# IM6402IPL
(1)	2.0 Mhz TTL Clock	Digi-Key PN# X104
(1)	5 Pin Din Socket	Radio-Shack # 274-005B
(4)	IN914 diodes	Radio-Shack # 276-1620
(1)	PNP Transistor	Radio-Shack # 276-1604
(1)	10 uf Cap.	Radio-Shack # 272-1025
(2)	220 ohm resistors	Radio-Shack # 271-1313
(1)	390 ohm resistor *	Radio-Shack # 271-018
	* use in place of 400 ohm in schematic	
(1)	47K ohm resistor	Radio-Shack # 217-1342
(1)	4013 flip flop	Radio-Shack # 276-2413

Misc. Card Connector from Digi-Key. Solderless breadboard. 22 ga. stranded wire.

Continued from page 53

If interchangeability is an important factor, look for a program that can load and save data in the SMUS format.



laying down additional tracks and being able to hear certain portions of previously-recorded music. However, if your synthesizer is not multi-timbral, actual playback of a complete song is limited (by the Amiga hardware) to a maximum of four voices (or notes) at any one time. Prior to playback, you should also be able to turn on and off selected tracks, either by selecting the one you want to hear, or by muting those that you don't want to play.

While there is a standard file format for music scores (the IFF SMUS format), each sequencer program saves data using its own proprietary format. As a result, you cannot use a sheet music print utility designed for one program with another program. If interchangeability is an important factor, look for a program that can load and save data in the SMUS format. One added advantage of SMUS is that you can load your composition into Electronic Arts' *Deluxe Music Construction Set*, display it in note and staff form and also obtain a "sheet music" printout.

Now, with all of these criteria fresh in your mind, let's proceed to the individual packages available.

Dr. T's Keyboard Controlled Sequencer (KCS)
Dr. T's Music Software

Dr. T's KCS is unique in that it has two separate and distinct recording modes—Track and Open—as well as "bells and whistles" too numerous to mention in this article. The Track mode operates like the other sequencers and provides you with 48 separate tracks which can be muted or designated as solo. Each track is attached to a user-designated MIDI channel. You cannot, however, combine patterns to form a song. You must first copy the recorded tracks to a designated sequence number in the Open mode, assemble those sequences into a song, and finally copy them back to tracks in the Track mode. Once this is accomplished, you can continue to overdub. In the Track mode, once you have recorded a track, the program automatically plays it back and shifts recording to the next available track. This process of automatic overdub continues until all of the tracks are used.

In the Open mode, however, there are no tracks—you just play and the sequencer accepts information from different MIDI channels simultaneously. This is useful when using synthesizers with automatic bass, rhythm and chording accompaniments which output on several channels at once. What is particularly unique is the program's ability to later sort out and transfer all of this information to a number of single tracks, each of which will contain the events of a single MIDI channel. The Open mode records up to 128 separate sequences which can be combined in the Song mode to form a song. The sequences can be either musical (with notes) or control where a sequence can start and stop other sequences. In this mode, there are four different ways to record: Step Time, Real Time, Overdub and Record with Cue. Overdub will play back a specified track while you are recording on another, while Record with Cue will let you record starting from a specified measure. In the record mode for both Track and Open Modes, there is a count-in metronome which is channeled through the Amiga's internal voices, thus freeing up both a MIDI channel and a voice on your synthesizer. Moreover, *KCS* supports playback through the Amiga using IFF digitized sounds. You can play back sequences merely by pressing the appropriate sequence number or letter key on the keyboard.

In the Song mode, you can combine up to 100 sequences into a song. This mode is quite powerful, as you can loop through a series of designated sequences and can also set the starting point of the sequences. In this way several sequences can commence simultaneously, or you can instruct the program to play a given sequence only when another has finished.

Editing is quite similar in both the Track and Open modes, and you have the ability to use the mouse to select ranges for cutting, pasting and copying. To ease the burden of editing notes, designated keys represent certain note times (W = whole note; H = half note) and *KCS* can control over twenty different MIDI events.

KCS has a number of other unique features. One is the ability at any point in your composition to instruct the program to randomly play as the next note or sequence an event from a list of notes or sequences—producing a lifelike musical composition which will never be the same. The Align function automatically forces both tracks and sequences to line up with the start of each measure, and the Quantize function can correct both the start and duration times of the notes. Additionally, you can select a minute/second time display as well as the standard measure/beat display.

The manual is well organized, although you may have to read it carefully a few times to really learn and appreciate the differences between the Track and Open modes. Because there are so many different features, options and functions, *KCS* is more difficult to use and master than the other sequencers, and screens become quite crowded and confusing.

Dr. T's also offers several optional modules to enhance the utility of *KCS*. *Dr. Drums* is a separate disk containing almost 200 drum patterns. They can be loaded in *KCS* and used to drive a standard MIDI drum machine. *Dr. Keys* contains numerous piano patterns in various styles, and the *Copyist* can take a score generated by *KCS* and print it to a dot matrix or laser printer in note and staff form.

The Quest I: Texture
Sound Quest

Texture is a traditional sequencer which lets you record multi-track sequences and link them together in a list to form a song. Unlike other sequencers, the length of each pattern must be defined prior to recording, and the maximum length of each for most purposes is 545 beats. There are 24 tracks labelled A through X which can easily be selected using either the mouse or computer keyboard. Recording is as simple as selecting the track, the pattern and pressing "R" twice. At this point you'll hear a four-beat metronome lead-in on your synthesizer or drum machine, and you're off and running on the next beat.

Unfortunately, *Texture* does not utilize the internal Amiga sound channels for the metronome. To hear what you recorded, simply press the "P" key and then the space bar to stop. To record another of the 96 available patterns, press the plus (+) and minus (–) keys, or type G followed by a number to move to a specific pattern. Commands are available to solo any particular track or select all tracks.

When you have recorded your patterns,

press the TAB key and the window containing the track information will be replaced by the Link Display, where you combine your patterns to form a song. Again, you must first define its length by specifying the total number of links it will contain up to a maximum of 99. Next, sequentially assign the various patterns to the links. Now just press "P" again, and your links will be played in the order you specified. By pressing TAB, you can toggle back and forth between the Track and Link Display screens.

Texture facilitates the process of editing patterns with a number of time-saving commands. Auto-locate, invoked by pressing "L," permits you to jump right to a particular beat you specify. *Texture* also supports block copying and moving sections of a track both to a different place on the same track or to a different track. You cannot, however, use the mouse to grab ranges. The Fill command will fill an entire pattern with repetitions of a smaller segment, and you can also filter out a specified range of notes by pitch and save them to a different track. This is quite useful for separating the bass from the melody. There is, however, no automatic command to simultaneously move the first note of all tracks in a pattern to the very beginning. Most of the same functions are available in the Link mode which itself has several nice features. In each link (several of which may contain the same pattern) user-specified tracks can be muted. Finally the Quantize feature can be applied to each track both prior to and after actually recording. In *Texture,* quantization affects only the beat position of the note and not its length.

User control is extremely flexible in *Texture*. You can perform almost all functions using the mouse to point and click or by making pull-down menu selections. The fastest way, however, is to use the computer keyboard. And to make things easier, key assignments are always displayed on the screen, and you can press the HELP key for on-screen assistance.

The screen layout is well thought out and the various windows display all of the pertinent information in a logical, easily understandable manner. Perhaps the best part of *Texture,* however, is the manual. The first sections contain a tutorial to get you started quickly. This is followed by an overview of the program, and the remainder is a thorough reference guide for all of the functions and features. Each of them is well defined, and followed by examples, hints and comments.

Soundscape Pro
Mimetics Corporation

This program was the first MIDI sequencer for the Amiga to appear on the market. Unlike the others, it takes a rather unique approach to sequencing; Mimetics calls *Soundscape* a "music operating system." It is built around numerous multitasking modules, many of which are optional. The nerve center of *Soundscape* is the Patch Panel Window which is divided into two columns—the left representing input devices, the right output devices. Various icons depicting these devices are displayed, and you connect them with "software wires" by clicking on an icon on the left side and then one on the right.

You can use the Amiga keyboard as a musical input device and the four Amiga internal audio channels as an output device using sampled sounds provided by Mimetics. These are referred to as the Console Keyboard and Sampled Sound Player, respectively. When you click on the Console Keyboard on the left side as an input device and the Sampled Sound Player on the right side as an output device, a line is drawn between the two, and you can play notes through the Amiga by pressing keys on the computer keyboard. Another unique output device is the Player Piano—a graphic depiction of a piano keyboard. If sounds are routed through this device, the notes being played are highlighted on the piano keyboard. The important point is that you can have multiple input and output devices operating simultaneously! Thus, your composition can play through the Amiga as well as a MIDI device and also show up on the Piano Keyboard.

Other devices are the MIDI port, the Tape Deck and the Clock. When you select some of these devices, a secondary window will open to allow you to adjust parameters unique to that device. As new modules and devices become available, you can configure *Soundscape* so that they will automatically load and appear on the Patch Panel when the program begins.

To record from a synthesizer, you must click on the MIDI icon on the left side of the Patch Panel and the Tape Deck icon on the right side to connect the two. Then double click on the Tape Deck icon, and both the Clock and Tape Deck windows will open. The number of available tracks and sequences is limited only by the available memory of your Amiga, and the input and output devices for each track are indicated by device icons on the tape deck. To actually record, however, you must first start both the clock and the Tape Deck by clicking on the start button. Both those devices have fast forward and reverse buttons, and the clock has two numerical registers which remember event locations when you click on the button next to each register. This feature is handy for locating specific parts of your sequence. The Tape Deck also has automatic Punch In and Punch Out location counters. While these are measured by MIDI clock beats (and not musical measures and beats), they may also be set on the fly by clicking on buttons next to those registers. Another button opens a screen where you can filter out unwanted incoming and outgoing MIDI data. You can also specify a delay value (in MIDI clocks) for each channel. One nice feature is that you can record in step time using the computer keyboard to enter the pitch of the note and the function keys to enter its duration. Unfortunately, the program itself does not have a count-in feature although there are metronome tracks you can load in from disk which will accomplish the same purpose.

While recording with *Soundscape* is straightforward, editing and creating songs from patterns is a rather complex and cumbersome procedure. While individual events can be edited and deleted, there is no easy way to copy, move or delete ranges of notes within a track, nor to merge several tracks. Multiple tracks associated with a single pattern (such as bass, melody and chords for an eight-measure pattern) are not linked together, and combining patterns into songs becomes a process of transferring patterns from the Edit Sequence Window to the Store List Window to the Edit Song Window.

There are some major deficiencies in the manual which is devoted primarily to features other than actual sequencing. The instructions for sequencing are often confusing, and you will probably end up learning how to use *Soundscape* by trial and error.

The strength of *Soundscape,* however, lies in its modularity and the additional utility modules you can purchase. At this writing, Mimetics has two utility disks available. Included on the first are programs that will convert mouse movements to MIDI information, split the output of a synthesizer into separate MIDI channels (lower keyboard to Channel 1, upper keyboard to Channel 2), save and retrieve synthesizer patches and patterns, and allow you to synchronize music to motion pictures. The second utility disk contains a program that will display beats

and measures on the Tape Deck (rather than MIDI clocks) and also permit you to solo a track. Another program simulates an acoustical echo while others analyze and display incoming MIDI events in real time, and quantize as you record. Finally, Mimetics has included a public domain program called Fast Tracker which runs *Soundscape* in the background and quickly sets up a simple 16-track recorder, complete with graphic LED meters to display the music as you play it. Unlike *Soundscape* itself, Fast Tracker does have an automatic metronome and count-in feature.

Mimetics also offers a unique, optional module called *Pattern Splatter*. Mimetics describes this as a compositional tool which "takes rhythms that you define and notes that you play, shakes them up together, and produces music." While *Pattern Splatter* is almost impossible to describe, it does produce some unique, user-definable effects.

MIDI Magic
Brown-Wagh Publishing

MIDI Magic (developed by Circum Design) is the friendliest of all the sequencer programs and the easiest to use. It is a true Amiga program which can run in either medium resolution or interlace modes with an eight-color screen. Each of the functions has its own window which can be resized and dragged around the screen to a location of your choice, and there is also a memory meter which changes colors depending on the amount of available memory. Most functions are easily accessed by pointing and clicking the mouse on icons, although function keys are supported. The screens are well designed, presenting the required functions and information with a minimum of space (and confusion).

MIDI Magic can record up to 26 sequences, each containing 16 separate tracks. The program can also record on multiple tracks simultaneously. To help keep the beat, the top horizontal title bar is segmented according to the number of beats in the measure, and the appropriate segment flashes to the rhythm. You can even set the tempo in real time by tapping out a rhythm on either your synthesizer or the computer keyboard space bar. You can transpose and invert tracks by pressing single note keys on the synthesizer. The default parameters for your copy of *MIDI Magic* can easily be customized by editing the *MIDI Magic* icon. The program supports the usual functions such as merge, cut, copy and event editing and is predominantly mouse and menu driven.

The manual itself is crystal clear and extremely well organized with many screen and menu illustrations. And to make life easier, the 77-page manual is practically reproduced in on-line help screens. These can be accessed by pulling up an index and clicking on the appropriate topic, or by the menu option "Active Window" which brings up a help screen for the window that you are currently using.

It is clear that *MIDI Magic* was designed for musicians who prefer to spend their time composing rather than struggling to master a complicated computer program. While *MIDI Magic* doesn't have all of the esoteric bells and whistles of some of the other programs, it has everything you're likely to need, and its ease of use makes it one of the best all-around sequencers for all but the most demanding professional. According to Circum Design, additional modules will be released and include conversion routines for SMUS, Dr. T, and MIDI-formatted music as well as a synthesizer librarian.

Dynamic Studio
by New Wave Software

Although *Dynamic Studio* is not as complete and complex as the other sequencer programs, it does provide several unique and valuable features which make it a viable competitor for some applications. *Dynamic Studio* is basically a 16-track sequencer which provides a choice of six different divisions (or patterns) for each track. These patterns (which have no set or predetermined length) are designated by the letters A through F. The main disadvantage is that some jockeying and manipulation is required to compose a song with more than six multi-track patterns. Recording is similar to most of the other sequencers. You first select the appropriate track (1–16) and pattern (A–F), click on the record button, and play your synthesizer.

The Sequencer screen contains a line for each track which displays appropriate information such as its status, length, time signature and MIDI channel. The rightmost portion of the line is reserved for designating a sequence for the patterns on that track. For example, "3AB2C–" would mean that pattern A would be played three times, followed by pattern B once, followed by pattern C twice and finally a one measure rest. The notation "4(3AB2C–)" would repeat the entire previous sequence four times.

Of all its features, the most interesting is the editing mode in which the track data can be viewed in both standard text form or graphically much like a piano roll. In the Graphic Mode, the Sequence Editor screen contains a graphic piano keyboard positioned horizontally across the top of the screen. The notes appear as vertical rectangles (beneath the piano keys they represent) and their height represents the duration. When a sequence is played in this mode, the "piano roll" moves upwards and a pointer indicates the note currently being played.

To edit a particular note, press the mouse button to stop the sequence and find the track and pattern number containing that note. Then click on the note to be changed. Various buttons on the screen display the editing options. You can even move a note by dragging it from one position to another with the mouse. Without a doubt, this mode makes it reasonably easy to locate the precise position of an offending note and modify it. To modify MIDI event data, however, you must resort to the standard text method of editing which caused fatal system crashes fairly consistently when I attempted to edit data.

Track editing functions are accessed through pull-down menu items as well as keys. The usual functions (such as copy, merge, filter, change MIDI channel, time shift, transpose and tempo change) are all present.

There are also some unusual features. Alternate Channel lets you play alternate notes of a single chord on different MIDI channels, and Scramble rearranges all of the notes on a specified track in a selectable random fashion. There are also three different Quantize modes available. You can quantize the notes to start on a specified beat, and if you wish, also control their duration. A third method, "Tighten" starts the note halfway between the start of a beat and its original actual starting point.

Dynamic Studio will save (but not load) music in SMUS format, and there are also buttons at the bottom of the Sequencer screen which will filter out certain designated MIDI events both during and after recording.

The most valuable addition to *Dynamic Studio* is the inclusion (at no additional charge) of a fully programmable drum machine which contains 200 digital drum samples. Although this is a separate multitasking program, it can be synchronized to operate simultaneously with *Dynamic Studio* using the four internal voices of

AMIGA MIDI SEQUENCERS

FEATURES	KCS	Texture	MIDI Magic	Dynamic Studio	Soundscape
Price	$249.00	$199.95	$149.95	$199.95	$179.95
Memory Required	512K	512K	512K/ 1MB rec.	1MB	512K 1MB rec.
Number of Tracks	48	24	16	16	Memory Dependent
Number of Sequences	128	96	26	96	Memory Dependent
Maximum Sequence Length	Memory Dependent	545 beats	Memory Dependent	Memory Dependent	Memory Dependent
Number Sequences/ Song	100	99	100	Memory Dependent	Memory Dependent
Maximum Note Resolution (4/4)	1/960	1/192	1/480	1/384	Not avail.
Multi-track Recording	Yes	No	Yes	Yes	Yes
Merge Tracks	Yes	Yes	Yes	Yes	Yes
Quantize	Real time & Edit Note On/ Duration	Real time & Edit Duration	Edit Note On/ Duration	Edit Note On/ Duration	Edit Note On
Punch In/Punch Out	Yes	Yes	Yes	No	Yes
Count-off	Yes	Yes	Yes	Yes	Yes
Step Time Recording	Yes	Yes	Yes	Yes	No [option]
SMUS capability	No	No	No	Save Only	Yes
Manual	193 pages	96 pages	77 pages	57 pages	112 pages
Copy Protection	Yes	Keyword	None	None	Key Disk
Use Internal Voices	Yes	No	No	Drum machine Only	Yes

the Amiga. While it is outside the scope of this article to give a detailed description of the drum machine program, I can state without reservation that it is full featured, produces very realistic sounds, and can utilize standard IFF sound files (such as instruments and sound effects). So why not try using *Dynamic Studio* to produce the 1812 Overture, cannons and all!

The diskette also contains a Librarian program which loads and saves voice patches to synthesizers as well as a program that plays several songs in a row—much like a jukebox.

An optional program, *Sound Oasis,* is available to read digitized sounds from Mirage Digital Sampling Keyboard sound disks so that *Dynamic Studio* can play those sounds through the Amiga.

The manual is easy to read and significantly shorter than those that come with other sequencers. There are very few examples or comments. The manual appears to be directed at the amateur market, as in-depth discussions on the use of commands, MIDI and applications are omitted.

Summary

It is obvious that much time and effort was put into programming each of the sequencer packages I evaluated, and I have summarized the salient features of each in the comparison chart accompanying this article. The ultimate question as to which program is best is difficult if not impossible to answer and depends primarily on your needs.

If you are a full-time professional musician or recording studio engineer who will be working with a sequencer several hours each day, then *KCS* is most suitable, as it has the most features and optional utility modules (but is the most complicated and difficult to master as well as the most expensive).

Texture, too, is full featured and easier to understand.

For the semi-professional musician/home recording studio crowd, *MIDI Magic* is by far the easiest and most understandable program and is, in fact, fun to use. Its price of $149.95 certainly makes it a best buy for this market.

Dynamic Studio, however, while not as versatile, does provide a programmable drum machine and Librarian program at no extra charge, which makes it a tempting purchase (if they ever fix the bugs). Moreover, if your primary goal is being able to correct live performance data, then *Dynamic Studio*'s ability to depict the notes will make this your program of choice.

Although I have not reviewed it in this article, Dr. T's does market a nice basic eight-track sequencer for $69.95 titled *MIDI Recording Studio.* While this program may not be suitable for the serious musician, the price is right for entry-level music sequencing.

One final factor to consider in the purchase of a program is the level of technical support each company provides. Except for New Wave Software, all of the publishers had technical consultants available at the time I called to answer my questions and solve my problems. New Wave, however, had an answering machine available, and it took several days (on several different occasions) to contact someone who then had the programmer contact me (again a day or two later). As you may soon discover once you have purchased one of these packages, most of your problems will not be caused by the program but by the idiosyncrasies of your particular synthesizer and your failure to set it up or adjust it properly.

No matter which program you end up buying, you will find that a sequencer combined with an inexpensive four-track tape deck can produce affordable, professional-sounding, fully-orchestrated recordings you may never have dreamed possible. ■

Companies Mentioned:

Brown-Wagh Publishing
16795 Lark Avenue
Suite 210
Los Gatos, CA 95030
(408) 395-3838
MIDI Magic

Dr. T's Music Software
220 Boylston Street
Suite 206
Chesnut Hill, MA 02167
(617) 244-6954
Dr. T's Keyboard Controlled Sequencer (KCS)
MIDI Recording Studio

Mimetics Corp.
P.O. Box 1560
Cupertino, CA 95014
(408) 741-0117
Soundscape Pro

New Wave Software
P.O. Box 438
St. Clair Shores, MI 48080
(313) 771-4465
Dynamic Studio

Sound Quest
5 Glenaden Avenue East
Toronto, Ontario
Canada M8Y 2L2
(416) 234-0347
The Quest I: Texture

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gitized photographs to illustrate your database, you might consider to using a video camera and a frame grabber to capture the images.

Every editor (magazine, newspaper, book) I know is looking for fresh, new computer-related articles.

Writing, Of Course

My own financial independence has been accomplished by writing. This was a logical avenue for me since five days a week I do just that for the local newspaper. I got my foot in the computer-related publishing world's door by offering programs I had developed for my personal use for publication. In the past six years I've been paid to do that for a half dozen magazines, newspapers and one book company. Just because you aren't an expert in machine language (I'm not) or don't know how to decipher a circuit board (I can't either) doesn't mean you don't have something worth sharing with other computer enthusiast. Every editor (magazine, newspaper, book) I know is looking for fresh, new computer-related articles.

The accepted way to get an editor's attention is to send a query letter in which you introduce yourself, outline the article you want to write and include the first page or two (always typed double spaced) of the text. The editor will then respond with either a yes, no or maybe. More often it will be a qualified maybe—the editor will offer suggestions on how to slant the story to suit the publication and ask you to submit the complete article on speculation. This means you finish the article, make whatever changes they require and then if they like it, they will pay. And if you ask for one, most magazine will send you a "writer's guideline" which tells you precisely what the publication requires from you, what kind of articles they need, how to format the text, whom it should be submitted to and whether it should be on paper or disk.

Like I said, that is the normal submission route. But I've had more success submitting complete articles and reviews without going the "query letter" route. What I do is become familiar with the publication, pick a subject they haven't covered in the last year or so and drop what I consider is a finished article on the editor's desk. I follow each of these submissions with a two-week period of praying and fasting—and about 80% of the time the editor will buy the article.

Getting the editor to buy a software review without first querying them is more of a risk. Every computer magazine publishes them, so there is a market, but at this writing there is also an excess of reviews and a shortage of feature articles. But again submitting a finished review to an editor rather than querying them may be a good approach. Chances are they will not buy the review, but it serves as an example of what they can expect from you. Along with the review, you might include a list of software and hardware you are familiar with and would be willing to review. Don't be surprised if they turn down the review you submitted but assign you another to write for publication.

Write About What Interests You

I write about computers because they are one of my major interests, but you should write about what interests you most. Novels take more time and sweat to produce and more than luck to get published, but they can make you rich in a hurry (remember the best seller, *The Thorn Birds* was Colleen McCullough's first effort). And don't forget the thousands of special interest magazines (gardening, how-to, fishing, humor, to name a few). They all need articles, so put your computer and word processor to work satisfying them and your checking account.

I think one misconception which keeps more people from writing is the idea that magazines use only staff writers. That is not true. Most magazine articles are written by non-staffers, most of whom were not journalism majors but instead have knowledge in a specific field of interest. Even newspapers use a healthy number of freelance writers. And don't be afraid of being rejected—everyone gets rejection slips, they are part of the game.

Publicity

Every organization (civic club, professional societies, political parties, etc.) and most industries generate tons of news releases every year. If you have any writing skills and are familiar with the requirements of a good news release (if you aren't, look for reference books on the subject in your library) you can pick up some good money preparing and mailing these releases. Using your computer and printer, you should be able to churn out personalized cover letters and mass mailings in record time.

The same organizations who use news releases probably would be willing to pay someone to produce professional-quality newsletters or advertising flyers for them too. Because there is a flood of good desktop publishing programs coming to the market for every Commodore computer, using them to pay for your system is a natural. Don't forget churches when you are drumming up business either—think of how many programs are handed out in every church across America every Sunday morning. Many of these are still set using typewriters and photocopy machines. Chances are if you can offer them professional-quality alternatives at a reasonable price you'll have more offers than you can accept.

If you find you're in need of a Postscript printer to turn out your publications (and you probably will if you get serious about desktop publishing), don't let it sit idle when you're not using it. These printers don't come cheap, so don't miss a chance to recoup your investment. I suggest you check with the head of your local user's group and offer to print members' files on your printer for a dollar or so a sheet. In no time you should be able to pay off the printer and turn it into a money-making investment.

Labels and Address Lists

You would be surprised how many small businesses in your town would pay to have someone prepare and maintain their mailing list and the gummed labels associated with them. Unfortunately, many of the businesses who could benefit most from direct mailings aren't willing to devote the time and equipment required to set up and prepare their own list.

It is a rare organization, business, or church which doesn't use a mailing list, and all are potential money makers for your system.

I know one potter here in Asheville who bought a small computer system specifically for maintaining a mailing list of his clientele. For him such lists are a life line

which lets him tell his perennial customers about sales and new items. But six months after buying his system he decided it required too much of his time to master—time he felt would have been better spend at his craft. Out of frustration he abandoned the computer and now pays a friend familiar with computers to maintain his mailing list and print labels. The friend does the work in his spare time, picks up some extra cash (he also gets a discount on buying pottery) and the potter concentrates on his art. Both parties are happy.

I'll bet there are dozens of such "cottage industry" operators who need the same help in your town. And don't concentrate only on family-industries when you think of mailing list and label users. It is a rare organization, business, or church which doesn't use a mailing list, and all are potential money makers for your system.

Some programmers claim they have made more money via shareware than they have going through commercial distributors.

If you are a database management expert (or something along that line) you could pick up some cash keeping track of other people's data. I know a few professional photographers who would pay someone else to organize and cross reference their collection of photographs. Because many photographers make their money selling photos to publishers looking for a particular type of image—the better organized their collection of photos, the more sales they can make. By helping them organize their inventory you can help them quickly locate and sell specific pictures (i.e., four-year-old female feeding ice cream to large dog). You might consider doing the same type of record-keeping for mom-and-pop type stores. Most of them would welcome help solving their own inventory headaches.

Specialized Forms

Business and paperwork go hand in hand. Few business owners can get along without business forms. Most either hire printers to set and publish their own or buy them from forms dealers. But with your computer, the right software and a decent printer, you can create these custom forms in your own home. Two useful programs for such a business which come to my mind are *MicroLawyer* for the Commodore 128 and Amiga (Progressive Peripherals & Software) and *Business Forms Shop* for the Commodore 128 (Spinnaker). The former generates legal documents and the latter lets you design and print business-quality forms for special applications. For volume printing you'll still have to take your printouts to a commercial printer, but you should be able to work out an arrangement which allows you a comfortable margin of profit while still delivering personalized and specialized forms to your client.

More Ink and Paper Ideas

When it comes to moving ideas to paper, the computer is king. And when you look around, notice how many items are no more than printed paper. Look for ways to duplicate, improve or localize these items. How many cars on the road have bumper stickers? You can print those yourself using your printer (a color printer offers more potential) and gummed paper. The blank gummed paper (it comes in colors) can be purchased in sizes as small as 8 × 10 inches and in packs starting at 100 sheets (check for paper supply houses in the yellow pages). Again, community organizations like to offer bumper stickers to their members, the same is true of churches and schools. Don't forget the small markets either. What about designing and printing business cards, menus, sale flyers, coupons or letterhead for new or small businesses?

Writing Software

Another route for income from writing software is magazines like this. Nearly every computer publication prints short utility, productivity and entertainment program listings for their subscribers to duplicate. The disk-based magazines (like Loadstar) buy programs too. Normally they are willing to handle programs that are too long or complex for paper-based publications to consider.

Another profitable way to distribute your software is to upload it to a national network (like CompuServe or Q-Link) as "shareware." When you donate your creations as shareware, you attach a notice that states it can be shared freely with anyone with one provision—if the user finds it useful and wants to use it regularly, they are expected to send you a donation (usually $5–$10). I've talked to some programmers who claim they have made more money via shareware distribution than they have going through commercial distributors.

But if your programs are of professional quality, I suggest you contact a distributor first. They are always looking for good software with a unique twist. But most of what they buy is written in machine language not BASIC.

When you look around, notice how many items are no more than printed pages. Look for ways to duplicate these items.

Tax Advantages

Remember, saving money is the same as making it, and reducing your tax bill is a good place to start. I'll leave it to your accountant to tell you exactly how to avoid paying taxes using your computer, but almost every piece of equipment you purchase which is used in your business (as a publisher, teacher, printer, programmer, etc.) can be depreciated over several years to save you tax dollars. You should keep track of all the equipment and material you use to "turn a profit." In most cases those can be used as deductibles every April 15, and will reduce your tax bill.

Cashing In

These ideas don't come close to exhausting the potential uses your computer has for making money for you in your spare time. But hopefully they have given you some idea as to how you might squeeze some greenbacks out of your own system. But don't get the wrong impression out of all this talk of work and money—I still enjoy my computers. I guess you can sort of compare computers to horses: the same horse you harness for work can also be saddled for a leisure ride. Fortunately, the three computers I use (Commodore 64, Commodore 128 and Amiga) perform just as well entertaining as they do working. And don't tell my wife, but my "workhorses" wear a saddle just about as often as they do a harness when she's not around—if you know what I mean.

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space restrictions—most reviews should fit on a single printed page (if I fail at all, it is on keeping the last requirement). Time and space restrictions are a primary concern with all publications—there is rarely enough room to put all you would like to include in any issue or the time to cover all the new products or developments. Just like you, publications can't squeeze more than 24 hours out of a day.

Having answered those questions, the next I am asked is "Well if that's true, why don't you print reviews of software that stinks?" An editor explained it to me this way: "There is a limited space for reviews in each issue. Rather than use that space to discuss useless software, we believe the readers would prefer to learn about the excellent products coming to the market." That answer doesn't normally convince my strongest critics until I add, "The deal with the magazine goes like this. If the editors send me a product for review which I find lacking, I just tell them how I feel before writing the review. They then send me something better to review. Regardless, I get paid. So, to be very blunt, whether the software is great or trash is no skin off my nose (or checking account)."

I think that's a fair policy. And more than once, the editor and I have discussed and abandoned a review simply because I felt the product didn't meet or surpass the standard established by similar software in its category. That doesn't mean that only glowing reviews make it into print. I know my review of *The 64 Emulator* for the Amiga was not a resounding endorsement for the utility. But because the software held so much promise for so many people we published the review anyway—including the good and negative remarks.

I think most reputable computer publications operate with similar guidelines. But I have written for two publications which worked a little differently. One actively solicited negative reviews and the other (a book publishing company) mixed the good alongside the bad—both are now defunct. Maybe there is a moral there. Maybe people do prefer to read about good products rather than bad.

The next question people ask is, "Do the software distributors try to influence your reviews?" Again the answer is no. Over the last couple of years I've had the opportunity to meet many of the movers and shakers in the software industry, and not one has tried to persuade me to say anything good about a bad product—or actually say anything about any product at all (maybe I should change my mouth wash?). Each has simply offered software for consideration and have taken the bad remarks along with good.

But any software review (like a review of a play, book or movie) is a personal opinion—nothing more and nothing less. Readers should remember that. The only advantage reviewers have over most end users is that we usually get a chance to see more software, so we should be better able to compare products. But in the end we simply say good things about what we like and ignore the rest.

> Any software review (like a review of a play, book or movie) is a personal opinion — nothing more and nothing less. Readers should remember that.

Unfortunately this system doesn't always work best for everyone. For example: one of my all-time favorite war games is called *Combat Leader*. It was released by a company called Rapid Fire and distributed by Strategic Simulations, Inc. I loved it the first time I tried it (1984) and still enjoy it today. So I gave it a good review, while other reviewers picked it apart. I think they were wrong, and they think I'm crazy. I suspect our differences could all be traced back to what type of software each reviewer likes and what they expect to get when they boot it the first time. Reviews always come down to personal choice and preference. If you enjoy the type of software I like, you are going to agree with most of what I say. If not, you should take my reviews with a grain of salt.

Good editors recognize that each reviewer has different interests and assign reviews with that in mind. That's why I'm asked to review productivity software and war games more often than text adventures. If I enjoy the software I'm reviewing, I'll spend more time with it and the review should reflect that interest.

The last question I'm asked is where do I get copies of the software I review? In the beginning I bought the software I used. When I found a program I was enthusiastic about, I would offer a review for publication. About half the time, the review would be bought. After a time, the editors started sending me review copies of what crossed their desk, and as I met people in the industry, the companies began sending review copies directly to me. Now, about 80% of what I review comes directly from the software distributors instead of passing through the magazine's doors first. Each month I send the editor a list of software I have on hand which I think deserves a review. On the list I grade each program with stars—one star is poor and six is excellent. I rarely include a program that deserves fewer than three stars. Here's an example:

★★★★★	*Shakespeare* (Desktop Publishing) Infinity
★★★★★★	*DeluxeProductions* (Total Video) Electronic Arts
★★★★	*Flow* (Idea Processor) New Horizons
★★★★★	*Perfect Sound* (Digital Sound Sampler) SunRize
★★★★	*Express Paint* (Graphic/Text) PAR Software

(★★★ = good, ★★★★★★ = great)

Like you, I still enjoy working and playing with computers. I got a kick the first time I touched a keyboard, and I still get that same pleasure six years later. I hope I never take them for granted or cease to be amazed with what they can do. Every time I open a new software package or hardware box, I feel a lot like a kid on Christmas morning. What better job could a computer lover ask for than to review computer products and software? ■

Next Month in Commodore Magazine

Titanic: The Quest of the Century
The story behind the software and the adventure, including an interview with Dr. Robert Ballard.

Those Generous Pirates
Who's winning, who's losing and where do you fit in?

It's War, By God!
A complete overview of tactical and strategic war gaming.

Available on newsstands March 21, 1989.

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you have to ask for the money just as you had to with the board game. I'm glad the people at Leisure Genius chose to leave this feature just as it is. One of my greatest joys continues to be able to sneak a free stay on my sister's hotel-packed Park Place, just because she is so eager to roll the dice that she forgets to collect the rent.

There is one thing missing on the 64 version of the game which does exist on our board game. Over the years my family has created a unique rule about Free Parking which doesn't exist in the official rules. Any time someone has to pay a penalty or tax, we've always put the money in the middle of the board, and the first one to land on Free Parking got to scoop it up for themselves. Well you cannot bend or create new rules here. Just as you would expect, the computer forces everyone to play by the official game rules.

Conclusion

Monopoly has always been a favorite game around our house. I've always liked it because it had a great equalizing effect upon the players—neither age nor degree of education sways the game in the favor of any one competitor. But in my opinion the board-based game had two flaws: it took a great deal of time to finish a game, and all the different pieces meant parts were occasionally lost. The 64 version takes care of both problems. Because I can save a game to disk, I don't have to lose sleep trying to finish a game in one sitting. And because all the parts are computer generated, everything fits neatly on one floppy disk.

> The 64 version of Monopoly excels in the way it handles banking and property transactions.

But, best of all, the 64 version of Monopoly is exactly that—Monopoly. Thankfully, everyone involved with converting the board game to computer resisted the temptation of trying to "improve" on the perfect game. The basic game is exactly what you expect it to be. The only changes—except for a few environmental "bells and whistles"—are those which make the game play faster, and allows you to save a game in progress for future play. If you are a Monopoly fan, this is your game. ■

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Each option contains its own inherent advantages and drawbacks:

- **Speed**—Increases your ship's overall maneuverability and can be selected up to five times. This is by far your most important offensive and defensive attribute.
- **Shot**—Simply reverts your craft back to its original fire power status.
- **Side**—Allows you to fire short bursts emanating from the sides of your craft. Useful when moving quickly through tight alien formations.
- **Wing**—Increases the size of your ship and its firing range. Can be selected up to three times. Of dubious value. The last thing you need is to be a bigger target.
- **Bomb**—Allows you to trigger widespread explosions in front of your ship, eliminating most aliens within range. Excellent weapon for nuking large clusters of aliens.
- **Laser**—This projects a steady particle beam laser in front of the ship, instantly toasting anything in your path. For players who prefer their aliens flash fried.
- **Homing Missiles**—If nothing else, these are fun to watch. Simply press the fire button and watch 'em go! Will home in on any alien, regardless of their position on the screen. Very useful in later stages of the game.
- **Shields**—Offers immunity from alien fire for limited amounts of time, depending on the number of hits. Learn which portions of the game are insurmountable without this feature. But remember that shields will not save you from kamikaze alien fighters.

The game's mechanics are flawless except for one irritating detail. In the heat of battle—believe me, it gets very *hot*—looking for the spacebar to select a weapon can be fatal. When playing with a friend, have him tap it at the appropriate times. The solution isn't so simple when playing alone. Inventive players might find their elbows, or even their toes, on active duty.

How far does the game go? I've yet to find any starfighters who've reached the end, if there is one. Although this is a pattern game—alien positioning never changes from one game to another—the challenge never seems to end. The landscape never stops changing, featuring new and deadly types of aliens: mobile gun turrets, robot sentries, homing missiles and . . . who knows?

Alcon is full of delightful surprises and pleasant frustration. For those who enjoy pushing themselves beyond the limit, past known horizons, this is your game. ■

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can move like a cat from one computer architecture and machine language to another, is even more difficult. Once that is achieved, the worm will become one of the most effective spies and saboteurs the world has ever known.

Sabotage and Espionage

Sabotage is a proven concept for computer software. One virus that has been floating around the Silicon Valley area of California for a number of years actually has the ability to overload and overheat the circuits in certain types of monitors. This can result in an actual fire, causing the monitor to burst into flames. This, though, is an overt, detectable act. Only simple, subtle changes are required to totally disable certain systems.

Consider this scenario: The world is on the brink of nuclear war. For whatever inane reason, the button is pushed and ICBM's are launched. In the guidance computers of these ICBM's resides a specially-designed, worm-like program that has been covertly implanted by the rival nation. It has been doing nothing more than bouncing around available RAM for years waiting for its moment in the limelight. The sudden flurry of activity in the guidance computer initiates the program's primary function. Its only task is to intercept the course correction data and change the sign of the number. If the guidance computer tells the rocket to correct +2 degrees, the worm alters the data to –2 degrees and the missile complies. The guidance computer then tries to correct +4 degrees, which is interpreted as –4 degrees. It turns out the missile will begin a series of dwindling loops until it either crashes or destroys itself.

Does this sound like a complex, difficult piece of code? How much code does it take to change the sign of a number from plus to minus and minus to plus? Even a BASIC neophyte could do it in one line. Worm programs, too, can be very compact. The smallest yet written consumes only 17 bytes! Just think of how difficult it would be to locate 25 bytes or so of code that is constantly on the move in RAM. Those 25 bytes could have the ability to render even a Cray 2 powerless in nanoseconds.

All modern weaponry is heavily dependent upon computers and on a constant stream of outside data. The multi-billion-dollar Strategic Defense Initiative system could be rendered powerless by one hacker in his garage with an Amiga 2000. All he has to do is to load the right program into the right place at the right time. Since SDI requires the processing of huge amounts of data very rapidly and accurately, and the shooting of some kind of weapon that will intercept an incoming warhead barely two feet long, traveling at nearly 18,000 mph, the slightest glitch in the interpretation of this data will mean a miss.

While sabotage is a possibility, the probable next desired real use of such sophisticated self-moving, autonomous programs is in espionage, both industrial and political. Undetectable programs could be used as spies, lying in wait, constantly on the move, then, when no one is looking, grab computer code and sneak out undetected. As Harry Houdini used to say, safes and locks are designed for keeping people from breaking in, not breaking out. If this industrial spy device could find its way in, it would be no trick to grab all of the new drawings from an engineering department's CAD directory, wait until after midnight, then phone them out. No computers require a password or other security device to get data out once access is attained.

Our little spy could be loaded onto any nation's defense computer, grab any interesting code it wants, then leave the way it came in. How to get in? How about via satellite? Satellites are constantly acquiring data and transferring it to defense computers. No one would detect an extra 25 or so bytes coming in with the megabytes of data every minute. Once in, coming out could be by the same route, our spy just directing the backflow of data to another satellite or different ground-based computer for a few microseconds.

The act of cracking entry codes is simply problematic. The writers of commercial software are fully aware of this. For every copy protection scheme yet devised, crackers have been able to circumvent the system. Most commercial software companies have thrown up their hands at trying to protect their software from illegal copying and now simply put their trust in people's honesty.

Our little espionage program could get in anywhere if a sufficient level of sophistication were built into it. Much of the onus of keeping unwanted worms and viruses from prying their way into the computer lies with the operating system. The UNIX operating system, it so happens, is susceptible to such worms and viruses. A recent well-publicized, worm invasion that infected some defense computers exploited the shortcomings of the UNIX operating system. Some other operating systems are more difficult, but all are eventually crackable.

If history has taught us anything, it's that for every sophisticated lock maker, there is an equally sophisticated lock pick-

Core Wars

Does the concept of worms and viruses fascinate you? There is a society of computer programmers just like you called the International Core Wars Society (ICWS). They pit their programming skills in a game called Core Wars. Core Wars is an outgrowth of a game called "Darwin" originally developed in ATT Bell Labs.

Core wars works something like this: Two competitors write their own "warrior" programs. These programs are loaded into a computer program called an arena, or Core Wars Coliseum. The computer starts the game by equally dividing computer time between the two competitors. The two programs then compete for more computer time. A winner is declared when one program forces the computer to allot all of its time to that program. The other competitor is then "dead."

In this anything-goes format, the software can reproduce, grab memory, overwrite the other program or do just about anything it can to force the other competitor out. These characteristics have direct analogies to worm and virus programs.

Does this sound like a childish game? Both the Soviet Academy of Science and the Central Intelligence Agency don't think so; they are two in a long and distinguished list of members. Annual competitions are held that pit the skills of some of the best programmers in the world.

For more information, contact:
International CORE WARS Society
Attn: William R. Buckley
5712 Kern Drive
Huntington Beach, CA 92649-4535.

For those of you with an IBM co-processor card, you can write to AMRAN, at 5712 Kern Drive, Huntington Beach, CA 92649-4535 for their Core War Coliseum software package. It runs on all IBM-compatible computers. The price is $24.95 U.S., and includes a MARS which fully implements the current ICWS Core Wars Standard, dubbed CWS'86, and a companion Redcode Assembler. Documentation is not yet available, but the supplier assures the product is easy to use without printed assistance.

er ready, willing and able to get to work rendering the lock maker's latest creation useless. The same will be true for computer security. No matter how good the security of a system or network, there will always be a way in. These systems are entirely too complex to possibly eliminate every possible avenue. Let's suppose that an extremely complex code is required for access to a critical computer system. Our espionage worm could be programmed to lie in wait in a buffer or terminal, constantly on the move and never interfering with any ongoing work until someone with the correct access code logs on. The espionage program then dashes in when no one suspects, and just like that, your little spy is in place ready to steal or alter anything it wishes.

Can anything be done about this? That answer is difficult. It may be that nothing can be done. The lock pickers will advance at the same rate as the lock makers. The only avenue seems to be the same avenue travelled for just about every other criminal act in the history of man: punishment for those caught. Whether this is or is not a deterrent is a subject of debate. After all, no one ever expects to get caught. The threat of getting caught may even lend more excitement to the challenge. Research is being done, however, to use individual traits for access of computers. Things like voice prints and fingerprints could be used instead of codes. This merely closes one door. It does nothing for computers on a network or for programs that can reside in a terminal or buffer until someone with real clearance logs on, when they sneak in.

For the average computer buff, very little can be done to prevent the incursion of viruses, worms and other sneaky little computer demons from getting into your system. Every time you log on to a BBS and download a program or data, you're open for infection. Every time you use a disk that is not either new or factory wrapped, you're exposed. It is entirely possible that commercial software companies and hard disk manufacturers could be infiltrated and spread the infections with brand new equipment. Like crossing the street, or sex in the '80's, there's always a chance we take in just about everything we do.

Next month we'll examine voice recognition systems. We'll take a peek at what's available now, what's coming soon, and what you will be able to do with them as we continue . . . Looking Ahead.

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When a bomb starts to flash, you have only a few seconds to reach it before detonation. If you are unsuccessful, you will either be killed or the landmark will be defaced.

nus screen displays any bonus points from the previous level. While this is happening, music plays in the background, and soft colors scroll across the screen. Then you will be taken to the next level of play.

To make you more aware of your current status, there are three indicators on the far right side of the screen. These show the current score, level and the number of lives remaining. Also, at the top you will find the number one high score to remind you how well you stack up against the best.

Bomb Busters is one of the best strategy-action games I've ever played on any computer system. The increasing difficulty makes it challenging enough to hold your interest, and after about 50 hours of play I've only made it to level 7. Also included is a pause option and a top ten of the best Bomb Busters. The music and sound effects are perhaps the best to date for any Amiga game. Its snappy, modern music makes playing enjoyable (especially the rap music). I would like to see more games from ReadySoft with equally great modern music. The graphics and special effects are terrific, teamed with super music, making it one of the best original Amiga games on the market!

Explosion Expulsion: *Bomb Busters* Hints

- To get the most points, wait until one of the bombs is flashing. After one has started flashing, make sure you collect it *first*. This is very risky—especially in the higher levels, but it will give you a lot more points per bomb.
- Try not to hit yourself on any structure surrounding the landmark. If you hit too many times, a life will be lost. To prevent this, use less power in your jet pack by pulling back on the joystick before you hit the structure.
- It's important to survival to collect the laughing bonus. To do this, stand in one place when it appears, then use your jet pack to capture it when it gets close enough.

Continued from page 63

The Long Road Home
Computers in Rehabilitative Medicine

At the G.H. Strong Rehabilitation Center in Vancouver, British Columbia, occupational therapist Jane Millard uses educational software to help adults recover from brain injuries caused by accidents or strokes.

One of their goals, according to Jane, "is to show our patients how the problem-solving approaches they learn here can be applied to other aspects of their life."

Stressing that computers are only one component of a diverse therapy program, Jane uses computers in the hopes of restoring the patients' prior reasoning abilities. Often, it can be a long time in returning. "One problem with brain injured people is their difficulty in being able to generalize," she explains. "We show them how to take what they learn and apply those skills to everyday activities when they return home."

One reason Jane uses computers is because they are non-judgemental. Another is that patients often experience a sense of accomplishment knowing they can control a sophisticated high-tech device. That, in turn, contributes to their self esteem.

Early on, she became dissatisfied with some of the software specifically designed for rehab medicine, so she searched out alternate sources.

One program she turned to is Strawberry Hills Software's *Surrounding Patterns*. When we tested *Surrounding Patterns* we were intrigued with the mathematical precision employed in encouraging pattern recognition and duplication.

By using different colored shapes (like blocks and triangles) the patient must recreate a given pattern in an adjacent grid. The patterns range from simplistic to extremely complex, and the program includes a create-your-own-design feature. By emphasizing perceptual, cognitive skills, *Surrounding Patterns* develops spatial relationship and problem-solving abilities.

An intense yet colorful pattern-recognition program, this is the most versatile we've seen. Seeing it in the light that Jane Millard does, we think it's suitable for classroom use as well as for learning-disabled children.

Surrounding Patterns
Publisher: Strawberry Hill Software
(604) 594-5947
Price: $55.00 (Teacher's Edition)
$19.99 (Home Edition)

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN, RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the "wrong" line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line of more than 80 (or 88) characters.

"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[^]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running". Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazine
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

Have fun with the programs!

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL [RETURN] on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT. .) incorrectly. Check the line in the magazine again and check your spelling.

OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $C000  (END AT
   49900/$C2EC)
30 READ A$:IF A$="END"THEN 110
40 L=ASC(MID$(A$,2,1))
50 H=ASC(MID$(A$,1,1))
60 L=L-48:IF L>9 THEN L=L-7
70 H=H-48:IF H>9 THEN H=H-7
80 PRINT"[HOME,RIGHT12]"P;
90 IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1000+INT((P-49152)/8):STOP
100 B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>86200 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
1000 DATA 4C,1F,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,0D,00,21
1002 DATA C1,27,C1,2F,C1,3F,C1,4C
1003 DATA C1,EA,EA,EA,4C,54,C0,A2
1004 DATA 05,BD,19,C0,95,73,CA,10
1005 DATA F8,60,60,A0,03,B9,00,02
1006 DATA D9,04,C1,D0,F5,88,10,F5
1007 DATA A0,05,B9,A2,E3,99,73,00
1008 DATA 88,10,F7,A9,00,8D,18,D4
1009 DATA 4C,EF,C0,E6,7A,D0,02,E6
1010 DATA 7B,4C,79,00,A5,9D,F0,F3
1011 DATA A5,7A,C9,FF,D0,ED,A5,7B
1012 DATA C9,01,D0,E7,20,2B,C0,AD
1013 DATA 00,02,20,74,C0,90,DC,A0
1014 DATA 00,4C,A9,C1,C9,30,30,06
1015 DATA C9,3A,10,02,38,60,18,60
1016 DATA C8,B1,7A,C9,20,D0,03,C8
1017 DATA D0,F7,B1,7A,60,18,C8,B1
1018 DATA 7A,F0,37,C9,22,F0,F5,6D
1019 DATA 03,C0,8D,03,C0,AD,04,C0
1020 DATA 69,00,8D,04,C0,4C,8E,C0
1021 DATA 18,6D,05,C0,8D,05,C0,90
1022 DATA 03,EE,06,C0,EE,09,C0,4C
1023 DATA CE,C1,18,6D,08,C0,8D,08
1024 DATA C0,90,03,EE,07,C0,EE,0A
1025 DATA C0,60,0A,A8,B9,0F,C0,85
1026 DATA FB,B9,10,C0,85,FC,A0,00
1027 DATA A9,12,20,D2,FF,B1,FB,F0
1028 DATA 06,20,D2,FF,C8,D0,F6,20
1029 DATA BC,C2,20,E4,FF,F0,FB,A0
1030 DATA 18,B9,08,C1,20,D2,FF,88
1031 DATA 10,F7,68,68,A9,00,8D,00
1032 DATA 02,4C,74,A4,4B,49,4C,4C
1033 DATA 91,91,0D,20,20,20,20,20
1034 DATA 20,20,20,20,20,20,20,20
1035 DATA 20,20,20,20,20,20,20,91
1036 DATA 0D,51,55,4F,54,45,00,4B
1037 DATA 45,59,57,4F,52,44,00,23
1038 DATA 20,4F,46,20,43,48,41,52
1039 DATA 41,43,54,45,52,53,00,55
1040 DATA 4E,49,44,45,4E,54,49,46
1041 DATA 49,45,44,00,4E,4F,20,43
1042 DATA 48,45,43,4B,53,55,4D,00
1043 DATA C8,B1,7A,D0,FB,84,FD,C0
1044 DATA 09,10,03,4C,84,C1,88,88
1045 DATA 88,88,88,B1,7A,C9,27,D0
1046 DATA 13,A9,00,91,7A,C8,A2,00
1047 DATA B1,7A,9D,3C,03,C8,E8,E0
1048 DATA 04,D0,F5,60,A9,04,4C,CA
1049 DATA C0,A0,00,B9,00,02,99,40
1050 DATA 03,F0,F0,C8,D0,F5,A0,00
1051 DATA B9,40,03,F0,E6,99,00,02
1052 DATA C8,D0,F5,20,96,C1,4C,12
1053 DATA C2,A0,09,A9,00,99,03,C0
1054 DATA 8D,3C,03,88,10,F7,A9,80
1055 DATA 85,02,A0,00,20,58,C1,20
1056 DATA 89,C1,20,ED,C1,E6,7A,E6
1057 DATA 7B,20,7C,A5,A0,00,20,80
1058 DATA C0,F0,D0,24,02,F0,06,4C
1059 DATA A8,C0,4C,CE,C1,C9,22,D0
1060 DATA 06,20,8D,C0,4C,CE,C1,20
1061 DATA BA,C0,4C,CE,C1,A0,00,B9
1062 DATA 00,02,20,74,C0,C8,90,0A
1063 DATA 18,6D,07,C0,8D,07,C0,4C
1064 DATA EF,C1,88,A2,00,B9,00,02
1065 DATA 9D,00,02,F0,04,E8,C8,D0
1066 DATA F4,60,18,AD,09,C0,69,41
1067 DATA 8D,09,C0,38,AD,0A,C0,E9
1068 DATA 19,90,06,8D,0A,C0,4C,1C
1069 DATA C2,AD,0A,C0,69,41,8D,0A
1070 DATA C0,AD,03,C0,6D,05,C0,48
1071 DATA AD,04,C0,6D,06,C0,8D,0C
1072 DATA C0,68,6D,08,C0,8D,0B,C0
1073 DATA AD,0C,C0,6D,07,C0,8D,0C
1074 DATA C0,38,E9,19,90,06,8D,0C
1075 DATA C0,4C,52,C2,AD,0C,C0,69
1076 DATA 41,8D,0C,C0,AD,0B,C0,E9
1077 DATA 19,90,06,8D,0B,C0,4C,67
1078 DATA C2,AD,0B,C0,69,41,8D,0B
1079 DATA C0,A0,01,AD,09,C0,CD,3C
1080 DATA 03,D0,20,C8,AD,0A,C0,CD
1081 DATA 3D,03,D0,17,C8,AD,0B,C0
1082 DATA CD,3E,03,D0,0E,AD,0C,C0
1083 DATA CD,3F,03,D0,06,20,CC,C2
1084 DATA 4C,4B,C0,98,48,68,4C,CA
1085 DATA C0,A9,20,8D,00,D4,8D,01
1086 DATA D4,A9,09,8D,05,D4,A9,0F
1087 DATA 8D,18,D4,60,20,A9,C2,A9
1088 DATA 81,20,DF,C2,A9,80,20,DF
1089 DATA C2,4C,D9,C2,20,A9,C2,A9
1090 DATA 11,20,DF,C2,A9,10,20,DF
1091 DATA C2,A9,00,8D,04,D4,60,8D
1092 DATA 04,D4,A2,70,A0,00,88,D0
1093 DATA FD,CA,D0,FA,60,END
```

END

```
5 TRAP 200
10 PRINT"[CLEAR]POKING -";
20 P=4864 :REM $1300  (END AT
   5545/$15A9)
30 READ A$:IF A$="END"THEN 110
80 PRINT"[HOME,RIGHT12]"P;
100 B=DEC(A$):POKE P,B:T=T+B:P=P+1
   :GOTO 30
110 IF T<>59382 THEN PRINT
   :PRINT"MISTAKE IN DATA --> CHECK
   DATA STATEMENTS":END
120 PRINT"DONE":END
200 PRINT:PRINT"DATA ERROR IN LINE";
   1000+INT((P-4864)/8):END
1000 DATA 4C,1E,13,4C,3A,13,00,00
1001 DATA 8E,00,F7,00,42,41,51,57
1002 DATA 0D,00,0D,43,08,14,0E,14
1003 DATA 16,14,26,14,33,14,A9,00
1004 DATA 8D,00,FF,AD,04,03,8D,12
1005 DATA 13,AD,05,03,8D,13,13,A2
1006 DATA 4A,A0,13,8E,04,03,8C,05
1007 DATA 03,60,AD,12,13,8D,04,03
1008 DATA AD,13,13,8D,05,03,60,6C
1009 DATA 12,13,A5,7F,D0,F9,AD,00
1010 DATA 02,20,5B,13,90,F1,A0,00
1011 DATA 4C,6F,14,C9,30,30,06,C9
1012 DATA 3A,10,02,38,60,18,60,C8
1013 DATA B1,3D,C9,20,D0,03,C8,D0
1014 DATA F7,B1,3D,60,18,C8,B1,3D
1015 DATA F0,35,C9,22,F0,F5,6D,06
1016 DATA 13,8D,06,13,AD,07,13,69
1017 DATA 00,8D,07,13,4C,75,13,18
1018 DATA 6D,08,13,8D,08,13,90,03
1019 DATA EE,09,13,EE,0C,13,60,18
1020 DATA 6D,0B,13,8D,0B,13,90,03
1021 DATA EE,0A,13,EE,0D,13,60,0A
1022 DATA A8,B9,14,13,85,FB,B9,15
1023 DATA 13,85,FC,A0,00,8C,00,FF
1024 DATA A9,12,20,D2,FF,B1,FB,F0
1025 DATA 06,20,D2,FF,C8,D0,F6,20
1026 DATA 79,15,20,A3,15,20,E4,FF
1027 DATA F0,FB,A0,1B,B9,EF,13,20
1028 DATA D2,FF,88,10,F7,68,68,A9
1029 DATA 00,8D,00,02,4C,B7,4D,91
1030 DATA 91,0D,20,20,20,20,20,20
1031 DATA 20,20,20,20,20,20,20,20
1032 DATA 20,20,20,20,20,20,91,0D
1033 DATA 51,55,4F,54,45,00,4B,45
1034 DATA 59,57,4F,52,44,00,23,20
1035 DATA 4F,46,20,43,48,41,52,41
1036 DATA 43,54,45,52,53,00,55,4E
1037 DATA 49,44,45,4E,54,49,46,49
1038 DATA 45,44,00,4E,4F,20,43,48
1039 DATA 45,43,4B,53,55,4D,00,C8
1040 DATA B1,3D,D0,FB,98,30,04,C9
1041 DATA 06,30,1E,88,88,88,88,88
1042 DATA B1,3D,C9,27,D0,13,A9,00
1043 DATA 91,3D,C8,A2,00,B1,3D,9D
1044 DATA 00,0B,C8,E8,E0,04,D0,F5
1045 DATA 60,4C,5C,15,4C,C5,14,A0
1046 DATA 09,A9,00,99,06,13,8D,00
1047 DATA 0B,88,10,F7,A9,80,85,FD
1048 DATA A0,00,20,3F,14,20,AE,14
1049 DATA 20,0D,43,84,FA,A0,FF,20
1050 DATA 67,13,F0,D8,24,FD,F0,06
1051 DATA 20,8F,13,4C,8F,14,C9,22
1052 DATA D0,06,20,74,13,4C,8F,14
1053 DATA 20,9F,13,4C,8F,14,A0,00
1054 DATA B9,00,02,20,5B,13,C8,90
1055 DATA 0A,18,6D,0A,13,8D,0A,13
1056 DATA 4C,B0,14,88,60,18,AD,0C
1057 DATA 13,69,41,8D,0C,13,38,AD
1058 DATA 0D,13,E9,19,90,06,8D,0D
1059 DATA 13,4C,CF,14,AD,0D,13,69
1060 DATA 41,8D,0D,13,AD,06,13,6D
1061 DATA 08,13,48,AD,07,13,6D,09
1062 DATA 13,8D,0F,13,68,6D,0B,13
1063 DATA 8D,0E,13,AD,0F,13,6D,0A
1064 DATA 13,8D,0F,13,38,E9,19,90
1065 DATA 06,8D,0F,13,4C,05,15,AD
1066 DATA 0F,13,69,41,8D,0F,13,AD
1067 DATA 0E,13,E9,19,90,06,8D,0E
1068 DATA 13,4C,1A,15,AD,0E,13,69
1069 DATA 41,8D,0E,13,A0,01,AD,0C
1070 DATA 13,CD,00,0B,D0,20,C8,AD
1071 DATA 0D,13,CD,01,0B,D0,17,C8
1072 DATA AD,0E,13,CD,02,0B,D0,0E
1073 DATA AD,0F,13,CD,03,0B,D0,06
1074 DATA 20,89,15,A4,FA,60,98,48
1075 DATA 68,4C,AF,13,A9,04,4C,AF
1076 DATA 13,A9,00,8D,00,FF,A9,20
1077 DATA 8D,00,D4,8D,01,D4,A9,09
1078 DATA 8D,05,D4,A9,0F,8D,18,D4
1079 DATA 60,20,61,15,A9,81,20,9C
1080 DATA 15,A9,80,20,9C,15,4C,96
1081 DATA 15,20,61,15,A9,11,20,9C
1082 DATA 15,A9,10,20,9C,15,A9,00
1083 DATA 8D,04,D4,60,8D,04,D4,A2
1084 DATA 70,A0,00,88,D0,FD,CA,D0
1085 DATA FA,60,END
```

END

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not sure which) locks the pad as a numeric input device (not editing tools).

Conclusion

When I broke the seal on the *Library* package, I wasn't sure I would find anything unique or useful inside. I already owned a good database, an excellent file management program and Workbench comes with a calculator. So I figured the only thing I'd find interesting in the collection of programs would be Program Editor and Calendar. I was wrong.

Notebook (while not comparable to a business-quality database) is useful, functional and amazingly easy to use.

Program Editor has all the features and editing tools I need. It is designed to be as easy to use as a word processor, and I suspect many users will use it for writing letters and forms. In fact, part of this review was written using it.

I wasn't thrilled with File Manager, mainly because it uses only one window. It will never replace my favorite DOS utility program, but it has plenty of options and should be able to handle the disk management chores of most users. Its inclusion is definitely a plus, but I wouldn't go out and buy *Library* just to get it.

On the other hand, Calendar, with its alarm function, is a delightfully useful program. I suspect this one will get plenty of wear and tear from me for a long time into the future.

The three modes of Calculator will interest people like math teachers, accountants and bank presidents, but my needs for the advanced functions offered here are limited.

The program disk comes with an excellent 600-page manual which identifies the *Library* as another premium offering from the WordPerfect Corporation. The setup and operation of each individual program is fully described in the manual, and each includes a separate tutorial. Plus the user can access on-screen help for each program by pressing the HELP key. And if that isn't enough, registered owners receive the same free telephone assistance *WordPerfect* owners have been spoiled with for years.

All in all I found *Library* an excellent addition to my own business software library. Even at its retail price, it is a bargain for those who need one or more of the utilities it contains. My only regret is that it does not include a miniature spreadsheet of some sort which would have put the gilding on an already excellent collection of software. ■

Continued from page 30

Color can also play an important role in your document's appearance, so 14 different hues are available for your border. A four-banded color ribbon will give you access to the full spectrum offered, with three-banded ribbons giving you half the choices. But even if you only have a black and white printer, you can obtain a similar result by swapping different ribbons. You first print a colored border, then roll the paper back and run it through again with another ribbon for the rest of the certificate.

Finally, the user is called upon to capsulize the reason for honoring the recipient in the award's Main Text area. In this most important body of the document, the imagination can run free, setting a mood as serious or off beat as desired. With the employment of word wrap, automatic centering and a few easy-to-use editing keys, the text-entering process is made effortless. Even those new to computing will find operations smooth and easy. Once this phase is completed, the document is ready to be printed.

The "endless hours of use" this package promises will be used to design and create, not decipher and construe operations.

This program's exceptional ease of use is evident throughout the entire creative process; from the beginning, where an enthusiastic instruction book greets and orients the user, to the end, where a well-stocked menu helps you to configure *Award Maker Plus* to match your printer and interface. The "endless hours of use" this package promises will be used to design and create, not decipher and construe operations.

The finished product that *Award Maker Plus* delivers is truly of eye-catching professional quality. Baudville stops at nothing to add an air of authenticity to your certificate. The package comes complete with twenty gold-embossed press-on seals for decoration, and even supplies an order form which you can mail away for pin-feed French parchment paper. It's as close to the real thing as you can get.

Well done, Baudville. Give yourself a well deserved pat on the back. Or better yet...

***Editor's Note:** An Amiga version of* Award Maker Plus *is now available for $49.95.* ■

Continued from page 15

Lode Runner III: Hold down COMMODORE/F and you can get up to 256 guys, or hold down COMMODORE/U and you can move to the next level.
Tom Eddy
Streetsboro, OH

Maniac Mansion: Always bring Bernard into the house with you. He knows about electronics and can be very useful. First have him open the Old-Fashioned Radio and take out the Tube. Then, if you can open the Outer Door in the Dungeon, have Bernard put the Tube in the Tube Socket in the Radio in the Green Tentacle's room. Use the Radio and enter the number 1977. The Meteor Police will answer and come to the Mansion.

I wish I could tell you how to open the door in the dungeon, but I haven't figured out how yet.

If you pull the Gargoyle on the right side on the bottom of the stairs, the door without a handle will open. Have a different character walk through it. Turn on the Light and walk to the left to get the Key. If you turn off the Circuit Breakers, be sure to turn them back on after the Cut Scene, or the house will be destroyed in a nuclear meltdown. To get past the Green Tentacle, give him the bowl of Waxed Fruit and Fruit Drinks.
Jason Allen
Boulder, CO

Missile Finder: During the end of the boost phase you can find missiles easily. Call up the EML in the sector where you use the OLR, if you have not destroyed the missiles you can use this method.

Second, go to the right of the screen. This makes sure you don't get hit by the attack rockets. Fire a laser across the screen. If the laser goes downward the missiles should be down, if it goes up it should be up.

When using the FEI, EML or NPB, always stay to the right so you don't get hit by an attack rocket.
Gerry Tablada
Address Unknown

Montezuma's Revenge: If you lose all your lives on the first level, just push the fire button. You'll receive five extra lives, and any treasures you had will still be in your inventory. You can only do this once, and only on the first level.
Cliff Wall
Mulberry, AR

One Man and His Droid: The passwords *Commodore* and *Bubble* will start you on the second level.
Jeremy Hubble
Belton, TX

Planetfall: You can get the key for the padlock by waving the U-shaped bar over the crevice. Take the ladder to the rift, drop it in, extend it, and move it over the rift. You can cross the rift any time you want to. Upper elevator, kitchen and shuttle cards are found north of the rift.

Floyd has the lower elevator card. Just turn him off and open compartment. Then at the second complex, you can get the cards in the bio-lab by examining the door. Floyd will go in and get it for you. The repair room has a small door in the north end of the room. You can't fit through it, but Floyd can. Tell him to go through the doorway, and he will tell you what is in that room. You can tell him to get anything that's in there.
Chad Schmitt
Address Unknown

Skate or Die: The world records are stored at track 35, sector 16 of side 1. You can use your favorite disk editor to make any changes. As always, these changes should be made on a backup disk, since one false move can ruin the diskette.
Shane D. Dolha
Regina, Saskatchewan
Canada

Spy vs. Spy II: Find any piece of the rocket, and dig pits around it. Stand off to the side and let the computer's spy fall into the hole. When he climbs out, start shooting him. (You did get the gun didn't you?) If you didn't get the gun, be ready to start inflicting some heavy cranial damage with the sword.

On a worse note: if the computer is about to complete the missile, he won't stop for you. Your only hope will be to booby trap the areas between the quicksand, giving you a chance to steal the missile. (This will be your last chance, so be quick about your business.) If all else fails, hit the 5 key. No opponent, no matter how dogged and relentless, can overcome the reset button!
Matt McLaine
Walterboro, SC

Rings of Zilfin: When you're starting out it will be easier to avoid the K-plants by going west to the desert from Ziad and then North. Be sure to write down the names of people you have talked with, as you will need this later in the game. Spice is worth a lot in Begonia. Last tea is needed in Sumaria.
Lance Gater
Address Unknown

Roadwar 2000: Turn off your disk drive, exit gang stat, and loot. You will find lots of everything. Don't forget to turn your drive back on.
Contributor Unknown

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Matt McLaine
Walterboro, SC

Test Drive: Cruise at about 130 mph, which is the lowest speed at which the police can't catch you.
Danny Correia
Saint John, New Brunswick
Canada

Thunder Chopper: While flying rescue missions, hovering is not necessary to retrieve missing personnel. Once you get near, lower the hoist and fly over the man at a low altitude at any speed, then raise the hoist once he's secure.
Frozen Fire
Address Unknown

Ultima II: You need to be blessed by Father Antos, who is on Planet X, before you are able to get the ring and win. The coordinates for Planet X are 9, 9, 9.
Peter Liang
Ann Arbor, MI

Underwurlde: If you have a sprite disabler such as Infinity Machine or Final Cartridge, use it! Load the game as usual, reset the computer, then

```
POKE 33090,169 RETURN
POKE 33091,40 RETURN
POKE 792,71 RETURN
POKE 793,254 RETURN
SYS 36861 RETURN
```

If you need more men, change the 40 above. Here are some other important pointers:

1. Don't go past the 27th level. All weapons are there or below.
2. The weapons will be in different locations every game.
3. You need the knife to get past the beetle creature.
4. You need the bow, found on level 27, for the Minotaur.
5. Map the game from level 27 to level 0.
6. The game will be completed when you reach level 0.
7. You need fireballs to kill the last guardian, the demon.

With the sprite disabler and over 40 men, it should be easy to complete a nearly impossible game.
Shukri Berisha
Address Unknown

Wheel of Fortune: The scoring records are on track 1, sector 0. If you have a track and sector editor and don't mind cheating, you can change them to your heart's content. Make sure you use a backup copy, or one little mistake can put your disk away.
Animesh Gandhi
Elizabeth, NJ

World Games: The world records are on track 16, sector 12. If you're skilled with a disk editor, change them to anything you'd like.
David Stewart
Hazel Green, AL

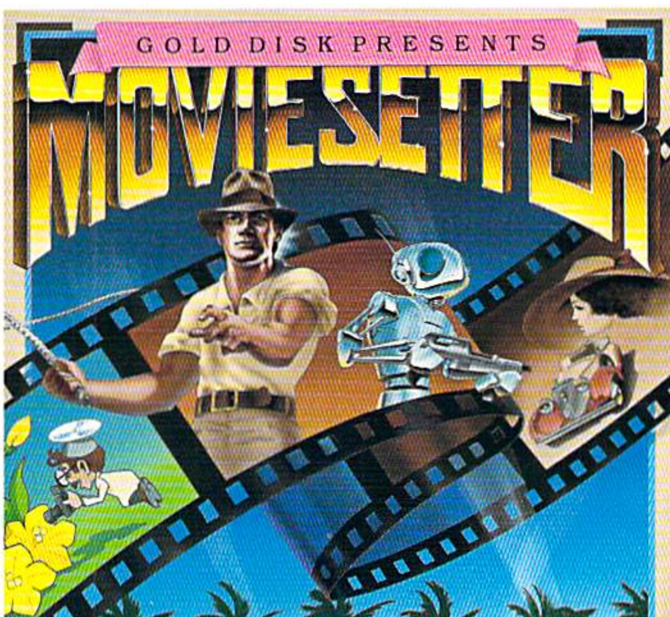
Yie Ar Kung-Fu: If you have gotten to Pole, you have probably found out that he is hard to beat. Well, here's a way: you've got to jump around a lot, then when he points his pole down, start high kicking him as many times as possible.
Doug Cross
Sellersburg, IN

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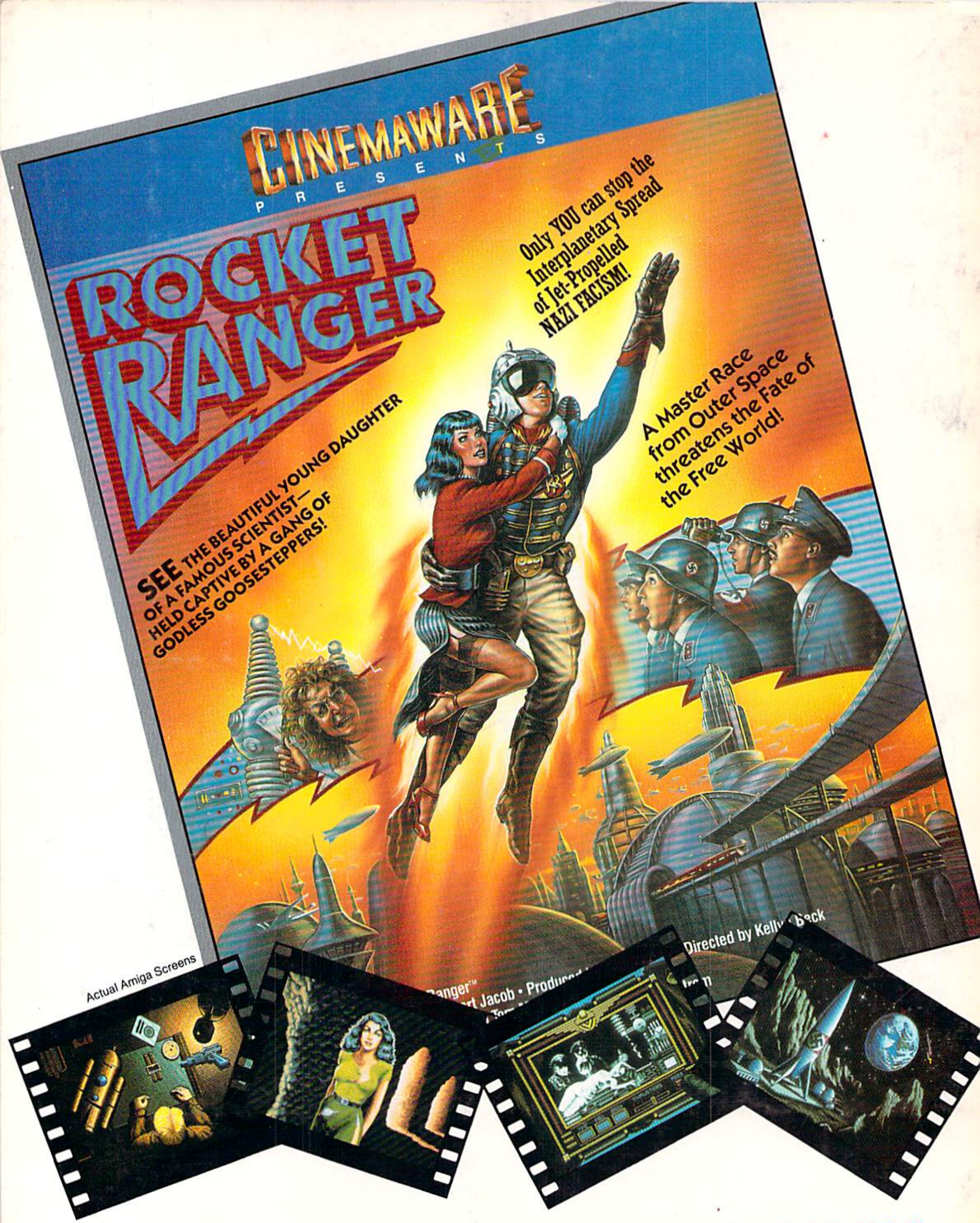
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